

2015-2016 PRODUCT CATALOG

ENGINEERING BEYOND THE SIGNAL™

COBALT®



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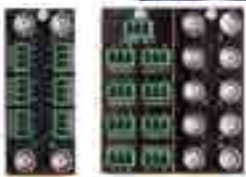
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HPF-9000 » HIGH-POWER 20-SLOT FRAME

The HPF-9000 is a 2RU high-density modular frame offering 360 Watts of net (user) available power in a high-capacity 20-slot format. (Maximum card capacity is determined by card model(s) installed and other factors. See 20-Slot Frame Card Capacity and Rear Modules on next page.) High power-density power supplies (single standard, redundant second optional) and engineered cooling/ventilation design allow 10 high-power cards in a frame (10 x 36 W = 360 W), or 20 medium-power cards in a frame (20 x 18 W = 360W). Separate forced-air cooling paths are provided for the card area and the power supply areas. An intelligent fan controller adjusts fan speed with changes in power supply loading and temperature.



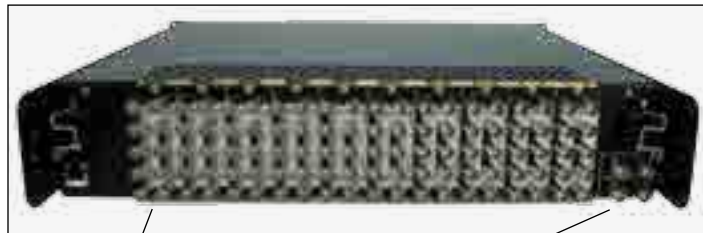
Modular Rear I/O

The HPF-9000 uses the same rear modules as our other 20-slot frames, allowing a seamless transition from current frames to the HPF-9000. These rear modules offer a broad selection for a flexible and wide array of interfaces such as BNC, twisted-pair audio, and fiber.

The HPF-9000 can accommodate two front-loaded PSU-9000 power supply modules. Adding a second (optional) supply gives the frame full power redundancy. The PSU-9000 power supply unit is interchangeable as a primary or redundant power supply module, with supplies in either position being hot-swappable. Each power supply contains an independent cooling fan, status LED, and a front-mounted power switch. The MFC-8320-N Network Controller Card (furnished as standard on the HPF-9000 frame) allows Ethernet connectivity to any number of connections for full multi-point control and monitoring via free Dashboard™ software. Optional SNMP support, for large scale monitoring implementation, is also available.



Hot-swappable power supply (with optional redundant supply) is easily replaced from front of frame



Individual **removable Rear I/O Modules** allow selecting the right connections for each card



Numerous Rear I/O Module choices provide input/output combinations that most suit your needs, including mixed interfaces (such as BNC and balanced analog audio)

» FEATURES

Highest available power for an openGear-compatible frame (360 Watts net) - 3x the available power of our previous 20-slot frame

Two independent looping references internally routed to all user card slots

Power supply is hot-swappable for 24/7 operation

Power switch/supplies accessible from the front of the frame

Separate power cords to each power supply for power redundancy

Network Controller Card (MFC-8320-N) enables multiple copies of Dashboard™ for seamless remote setup, monitoring, and control. SNMP option can further be added.

Fan status and error indicator LEDs on front of the frame

Hinged, pull-away front door panel lowers to allow quick, easy card insertion

Remote control/monitoring via Ethernet using free Dashboard™ software, or optional OGCP-9000 remote control panel

Five-year warranty

» ORDERING INFORMATION

HPF-9000-N High-Power 20-Slot Frame - 2RU with fans, cover plates for unused slots.

Includes one PSU-9000 Power Supply Module and MFC-8320-N Network Controller Card. (Network Controller Card allows multiple connection network control through Dashboard™ software or Cobalt OGCP-9000 Remote Control Panel.)

Note: Please see "20-Slot Frame Card Capacity and Rear Modules" on pages 18-19 for helpful information about practical card capacity, descriptions of available rear module types, and other important considerations.

PS-9000 Extra (redundant) HPF-9000 frame power supply

SNMP-HPF9000 Software option for MFC-8320-N card. Provides SNMP (v1 and v2) control and monitoring.

HPF9000-FSB Frame support bracket kit.

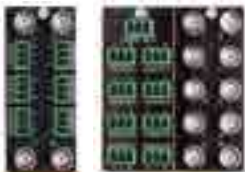
Note: Maximum cooling performance is obtained when a 1RU space is provided above the frame. Optional high-ventilation rear modules are available to increase airflow where above-frame cooling space is compromised (see "High Ventilation Rear Module" in the following pages for more information). Please contact Cobalt Sales for more information regarding frame build-out where ventilation is less than optimal.

OG3-FR » 20-SLOT FRAME

The OG3-FR is a next-generation 2RU high-density modular frame offering increased available user (net) power and enhanced Gigabit Ethernet control/monitoring in a high-capacity 20-slot format. (Maximum card capacity is determined by card model(s) installed and other factors. See 20-Slot Frame Card Capacity and Rear Modules on next page.) The frame's lightweight construction and removable, heavy-duty hinged front door is designed for maximum durability. Long term reliability is assured with the front mounted cooling fans and optional redundant power supply.



The OG3-FR-CN offers the same Ethernet connectivity via DashBoard as our previous 8321-CN frame in addition to providing gigabit Ethernet networking which enhances present and future support of the openGear® remote control platform, and supports the DataSafe feature which allows faster swap-out of cards (with all card settings stored locally on the frame network card instead of on the card). A new front-panel LCD display shows a user-configured frame name, IP address, and status.



Modular Rear I/O



LCD Status Screen

Separate forced-air cooling paths are provided for the card area and the power supply areas. An intelligent fan controller adjusts fan speed with changes in power supply loading and temperature.

The OG3-FR uses the same rear modules as our other 20-slot frame, allowing a seamless transition from an 8321 frame to the OG3-FR. These rear modules offer a broad selection for a flexible and wide array of interfaces such as BNC, twisted-pair audio, and fiber.

The OG3-FR can accommodate two power supply modules. Adding a second (optional) supply gives the frame full power redundancy. Each power supply contains an independent cooling fan, status LED, and a front-mounted power switch. Optional SNMP support, for large scale monitoring implementation, is also available.

» FEATURES

Standard 300 Watt (user net) power supply with integral cooling

Gigabit Ethernet offers faster access to cards, with support for future platform enhancements

Two independent looping references internally routed to all user card slots

Separate power cords to each power supply for power redundancy

Power switch/supplies accessible from the front of the frame

Independent card-based rear I/O modules flexibly support multiple interfaces, including coaxial, fiber, and 3-wire audio/control/comm interfaces. Wide array of rear I/O modules offer various connector break-outs, with high-density split rear modules allowing maximum 20-card per frame capacity.

Network Controller Card enables multiple copies of DashBoard™ for seamless remote setup, monitoring, and control

Front-panel LCD display shows frame name, IP address, and status

Hinged, pull-away front door panel lowers to allow quick, easy card insertion

Remote control/monitoring via Ethernet using free DashBoard™ software, or optional OGCP-9000 remote control panel

Optional SNMP control and monitoring

Five-year warranty

» ORDERING INFORMATION

OG3-FR 20-slot openGear® 2RU Frame with Fans and Metal Plates on Rear I/O - Includes one PS-OG3 Power Supply

OG3-FR-CN 20-slot openGear® 2RU Frame with Fans and Metal Plates on Rear I/O - Includes one PS-OG3 Power Supply and MFC-8322-N Advanced GigE Network Controller Card

OG3-FR-CNS 20-slot openGear® 2RU Frame with Fans and Metal Plates on Rear I/O - Includes one PS-OG3 Power Supply and MFC-8322-N Advanced GigE Network Controller Card with SNMP support

PS-OG3 Redundant or Spare Power Supply

FSB-OG3 Rear Support Bars and Brackets

Note: Please see "20-Slot Frame Card Capacity and Rear Modules" on the next page for helpful information about practical card capacity, descriptions of available rear module types, and other important considerations.

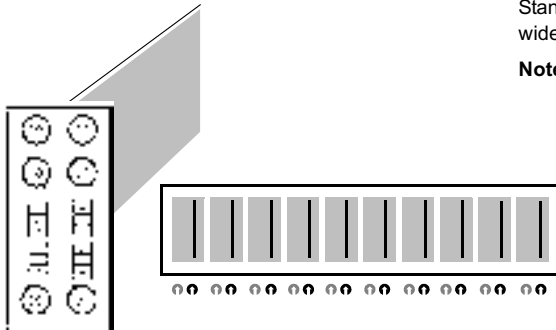


20-SLOT FRAME CARD CAPACITY AND REAR MODULES

Frame card capacity is largely determined by the rear modules that mate a card with its rear panel user connections.

For example, when using “split” rear modules, the card capacity in the 20-slot openGear®-compliant 2RU frame is greater than previously possible. 20-slot frames can be fitted with any mix of the rear module types described here, offering connection break-out that suits your requirements while maximizing frame capacity.

Standard-Width Rear Module



1 card per rear module
2 card slots used → 10 cards per frame (max)
10 rear modules per frame (max)

Standard-Width Rear Module occupies 2 card slots and can accommodate BNC and wired connections such as balanced audio and GPIO connections. Standard-width rear modules are available for all Cobalt cards, and offer a wide variety of signals accommodation choices in the smallest space.

Notes:

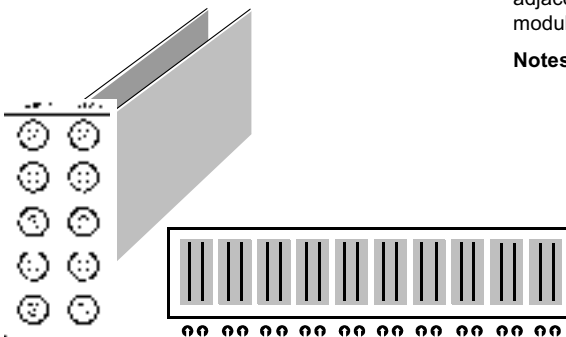
- Not all slots can be fitted with cards when using a standard-width rear module (for example, when a standard-width module is fitted in the right-most frame position (viewed from rear), first available slot is slot 2, with slot 1 not being available).

- In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:

- HPF-9000 Frame: 360W user budget
- OG3-FR Frame: 300W user budget
- 8321 Frame: 120W user budget

If necessary, consult Cobalt Sales for assistance in power planning.

Split Rear Module



2 cards per rear module
2 card slots used → 20 cards per frame (max)
10 rear modules per frame (max)

Split Rear Module occupies 2 card slots, but also accommodates 2 card in adjacent slots. In this manner, for a frame fitted entirely with split rear modules, the maximum 20-card frame capacity can be achieved.

Notes:

- Split rear modules are available only for certain Cobalt cards. Consult our catalog, card Product Manual, or our website for availability of rear modules for particular cards.

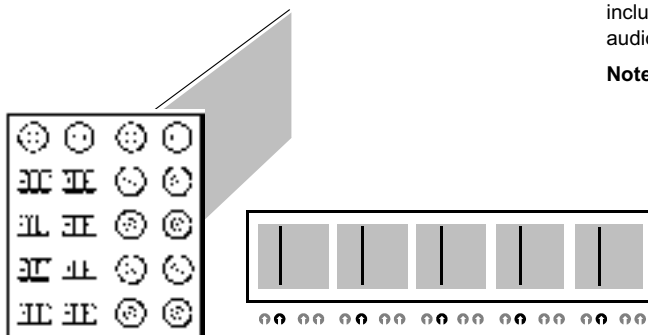
- Split rear modules may not in all cases support the maximum number of connections offered by a card. (For example, a 9323 card fitted with a split rear module offers two AES ports vs. four available when using a standard rear module. Some cards are available with split rear modules using high-density HD-BNC or DIN 1.0/2.3 connectors which allow more connections than with BNC connectors.)

- In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:

- HPF-9000 Frame: 360W user budget
- OG3-FR Frame: 300W user budget
- 8321 Frame: 120W user budget

If necessary, consult Cobalt Sales for assistance in power planning.

Double-Width Rear Module



1 card per rear module
4 card slots used → 5 cards per frame (max)
5 rear modules per frame (max)

Double-Width Rear Module occupies 4 card slots and can accommodate a very high degree of signal count and types, including multiple BNC and wired connections such as balanced audio and GPIO connections.

Notes:

- Not all slots can be fitted with cards when using a double-width rear module (for example, when a double-width module is fitted in the right-most frame position (viewed from rear), first available slot is slot 2, with slot 1 not being available).

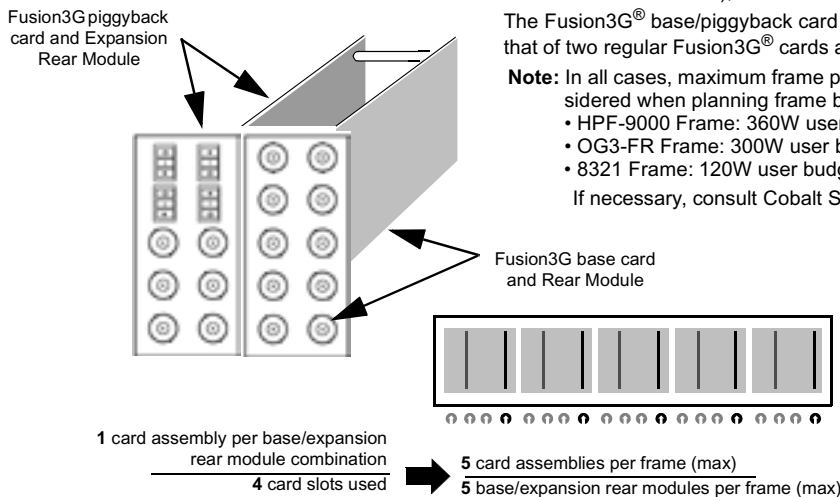
- In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:

- HPF-9000 Frame: 360W user budget
- OG3-FR Frame: 300W user budget
- 8321 Frame: 120W user budget

If necessary, consult Cobalt Sales for assistance in power planning.

20-SLOT FRAME CARD CAPACITY AND REAR MODULES

Expansion Rear Module (Fusion3G® only)



An **Expansion Rear Module** is used in conjunction with a Fusion3G® card equipped to provide optional features such as analog audio I/O (which is in turn provided by an Expansion piggyback card factory-installed on the base card when this option is ordered). Expansion Rear Modules are identified with "X" in the part number and **must be used in conjunction with a Base Rear Module**.

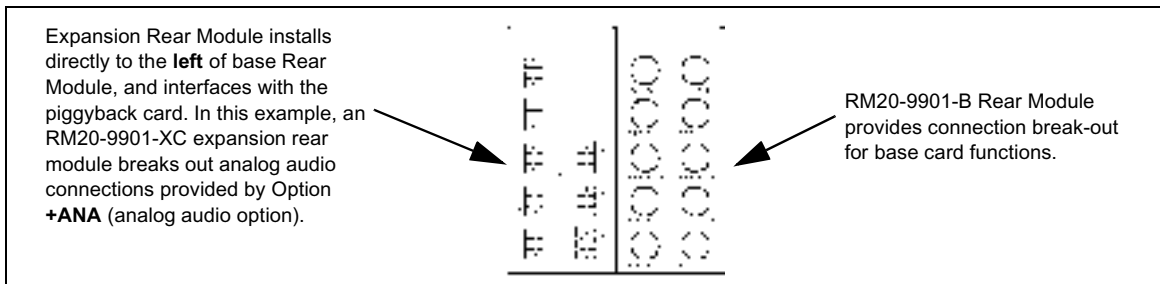
The expansion rear module installs directly to the **left** of the base Rear Module (as shown viewed from rear), and interfaces with the piggyback card.

The Fusion3G® base/piggyback card assembly occupies the space identical to that of two regular Fusion3G® cards and two standard-width rear modules.

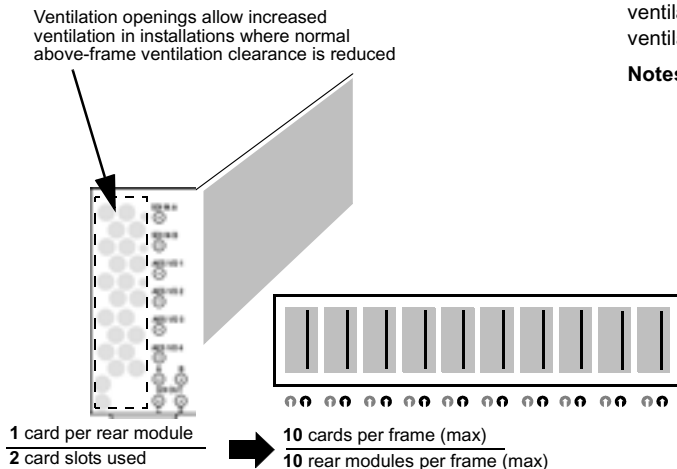
Note: In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:

- HPF-9000 Frame: 360W user budget
- OG3-FR Frame: 300W user budget
- 8321 Frame: 120W user budget

If necessary, consult Cobalt Sales for assistance in power planning.



High-Ventilation Rear Module



High Ventilation (HV) Rear Module occupies 2 card slots and offers coaxial connections using miniaturized connectors (HDBNC or DIN 1.0/2.3). These rear modules have openings to increase ventilation where the normal recommended above-frame ventilation space (1 RU) cannot be accommodated.

Notes:

- HV (high-ventilation) rear modules are available only for certain Cobalt cards. Consult our catalog, card Product Manual, or our website for availability of high-ventilation rear modules for particular cards.

- (Fusion3G® only) Where a base HV rear module is to be used in conjunction with an expansion rear module, a **companion HV expansion rear module must also be used**. Both base and expansion HV rear modules use card positioning that optimizes air flow across the component surface of the card PCB. Also note that when using an expansion rear module, frame capacity then follows the form as specified in "Expansion Rear Module" above.

- In all cases, maximum frame power budget for user slot total must be considered when planning frame build-out:
 - HPF-9000 Frame: 360W user budget
 - OG3-FR Frame: 300W user budget
 - 8321 Frame: 120W user budget

If necessary, consult Cobalt Sales for assistance in power planning.

DashBoard™

DashBoard™ is a control / monitoring application for the openGear® platform. It is available at no cost, and works with Windows®, Mac® and Linux®.

DashBoard™ provides a centralized user interface for all populated frame slots, allowing users to view and control all frames and cards on a network with a consistent, easy-to-use graphical interface. Cards define their controllable parameters to DashBoard™, so the control interface is always up to date.

In addition to extensive control and monitoring capabilities with its intuitive GUI, DashBoard™ allows for easily performed card software updates. Software update files can be downloaded from the Cobalt Digital website and then uploaded through DashBoard™.

To communicate with DashBoard™, an openGear® frame must have the optional MFC-8322-N network card installed.



FEATURES

Free application can be downloaded at www.cobaltdigital.com/dashboard

Java based and runs in Windows®, Mac® and Linux®

Multiple frames can be connected to multiple control and monitoring stations

Automatic discovery of cards

Software and firmware updates via ethernet

openGear® is a registered trademark of Ross Video Limited. DashBoard™ is a trademark of Ross Video Limited.

Network Controller Card

The MFC-8322-N is an optional network controller card that allows the OG3-FR openGear® frame to communicate with multiple copies of DashBoard™ or a Cobalt remote control panel via Ethernet and TCP/IP. This allows remote access to the openGear® frame across both LAN and WAN architectures. (HPF-9000 high-power frame comes standard with the Network Controller Card.)

The network controller card can also be purchased with SNMP support, for large scale monitoring implementation.



openGear

FEATURES

10/100 Mbit Ethernet Control

Enables multiple connections to DashBoard™

DataSafe™ feature stores all card parameters local to the frame, greatly reducing downtime if hot swapping solutions

SNMP agent software available as an option

Five-year warranty

ORDERING INFORMATION

MFC-8322-N Network Controller Card for 20-Slot openGear® Frame-Allows remote control and monitoring of cards through DashBoard™ Software

MFC-8322-NS Network Controller Card for 20-Slot openGear® Frame - Allows remote control and monitoring of cards through DashBoard™ Software with SNMP Software Option

SNMP Software Option for MFC-8322-N: Provides SNMP (v1 and v2) control and monitoring

DB-VIEW DashBoard™ Option for compiling user folders

openGear® is a registered trademark of Ross Video Limited. DashBoard™ is a trademark of Ross Video Limited.



"We wanted a 'one card does it all' solution for 3G applications in 1080 3D work, and the Cobalt Digital 9901-UDX models give us exactly what we need."

— George Hoover,
Chief Technology Officer, NEP Broadcasting

WE CALL IT FUSION3G® BECAUSE "THE CARD THAT DOES EVERYTHING" JUST ISN'T DESCRIPTIVE ENOUGH.

Fusion3G

The new line of Fusion3G® 9900-series cards for openGear® provides an unprecedented level of support – with 3G/HD/SD-SDI, fiber, analog video, as well as embedded, AES and analog audio proc and embed/de-embed. Fusion3G® offers a comprehensive array of processing features, including format conversion, frame sync, wings insertion, keying, color correction, advanced audio processing, full analog I/O, audio/video delay, audio embed/de-embed/cross-point and up/down mixing.

VERSATILITY

With input/output and conversion support for practically every current and legacy video/audio format, Fusion3G® truly offers single-card solutions supporting your plant's cable and fiber 3G/HD/SD-SDI environment as well as baseband discrete digital audio I/O and analog video/audio environments.

CAPACITY

Fusion3G® offers industry-leading function/feature density, allowing levels of processing in a single card previously possible only with multiple dedicated equipment.

USABILITY

Fusion3G® offers a central GUI control point for all of the card's functions over an easily implemented 10/100 LAN connection using a PC or Cobalt's Remote Control Panel. Powerful, intuitively designed GUI controls make simple work out of complex routing and signal processing tasks. Integration of user setting presets with GPI controls provide for automation in performing sophisticated setups while minimizing personnel requirements.

Fusion3G® represents our premier level of audio support, including extensive embed/de-embed and same card multi-DSP functions (such as multiple Dolby encoding and loudness processing/upmixing).

Event-based preset loading provides automated cord setup when transitioning between received conditions (for example, from an HD source to a legacy SD source).

SCALABILITY

State of the art software-based feature sets and upgrades allow Fusion3G® to be upgraded with features and options using software downloads that take only minutes to perform without removing the card from its frame. You're assured that your investment remains viable today and tomorrow, with the freedom to progressively add capabilities as your needs and budget permit.

FUSION3G CARD INDEX

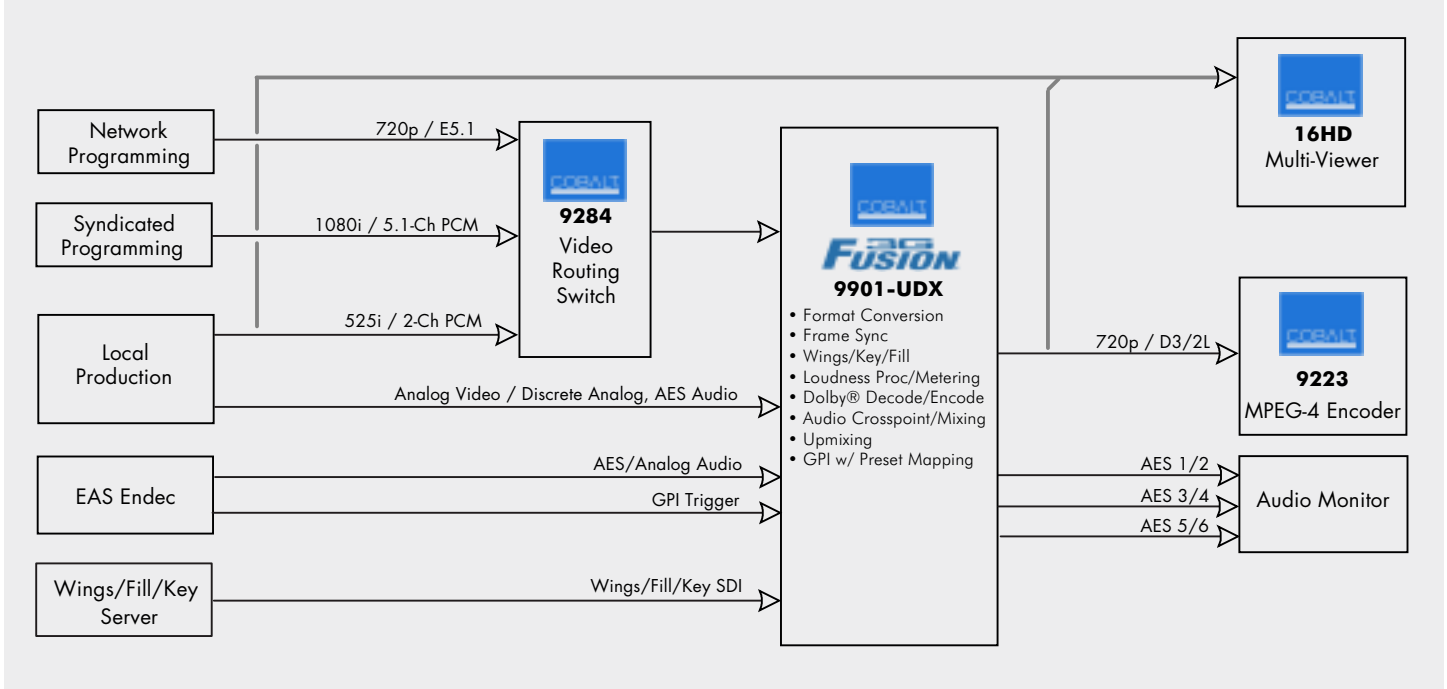
9901 (Format Conversion)	94
9921 (Frame Synchronizer)	106
9931 (Embedder/De-Embedder)	60
9985 (Loudness Processing)	114



» FUSION3G® 9900 SERIES	9901	9921	9931	9985
3G/HD/SD-SDI I/O	■	■	■	■
3G/HD Fiber I/O	□	□	□	□
Universal HD/SD Analog Video I/O	□	□	□	□
Analog Audio I/O	□	□	□	□
Frame Sync	■	■	□	■
Up/Down/Cross Conversion	■			
AES Embed	□	□	■	□
AES De-Embed	□	□	■	□
Loudness Processing	□	□	□	■
Pre/Post Loudness Metering	□	□	□	■
Audio Upmixing	□	□	□	□
Audio Downmixing	■	■	■	■
Per-Channel Audio Delay	■	■	■	■
Audio Mapping	■	■	■	■
GPIO	■	■	■	■
Timecode Support	■	■	■	■
Closed Caption Support	■	■	■	■
Dolby® Metadata Support	■	■	■	■
ARC	■			
Relay Bypass	□	□	□	□
Wings Insertion	□	□		□
Keyer	□	□		□
Color Correction	□	□	□	□
Dolby® Decode/Encode/Transcode	□	□	□	□

■ Standard Feature □ Optional Feature

» FUSION3G® APPLICATION IN BROADCAST FACILITY



A single Fusion3G® 9901-UDX card can handle all the contribution sources shown here and provide a consistent format, loudness-processed stream regardless of the contribution format (some functions shown here require card options; please see 9901-UDX data sheet). Other Cobalt products, including contribution routing, MPEG encoding, and 16HD multiviewer are also shown here.

» SPECIFICATIONS

Video Input Output

9901	(4 In, 4 Out)
9921-FS	(4 In, 4 Out)
9931-EMDE	(1 In, 4 Out)
9985	(4 In, 4 Out)
Standards:	SD: 486i59.94, 576i50 HD: 1080i59.94, 1080i50, 1080p24, 1080p23.98, 1080psf24, 1080psf23.98 720p59.94, 720p50, 720p24, 720p23.98 3G: SMPTE 425 level A: 1080p59.94, 1080p50
Cable Length:	3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss:	>15 dB up to 1.485 GHz >10 dB up to 2.970 GHz
Alignment Jitter:	3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter:	3G/HD/SD: < 2.0/1.0/0.2 UI

Frame Reference Input

Signal:	SMPTE 170M/318M "Black Burst" SMPTE 274M/296M "Tri-Level"
Return Loss:	>35 dB up to 5.75 MHz

Audio/Video Delay

Conversion Latency:	1 frame
Frame Sync Min Latency:	2 lines
Video Delay:	3G/HD/SD: 0.5/1.0/5.0 sec
Audio Delay:	16 channels, per channel adjustment, 1 sample step size Up to 5 sec delay for each ch

Serial I/O

Connector:	Two, independent function
Connector:	3-terminal Phoenix
Functions:	Tx/Rx for Dolby® metadata, RS-485 LTC, logging/reserved functions

AES Audio Input/Output (8)

Physical Interface:	BNC per AES3-1d
Input Level:	0.2 to 2 Vp-p
Output Level:	1.0 Vp-p
Impedance:	75Ω
Return Loss:	>15 dB up to 6.144 MHz
Input SRC Range:	32 to 96 kHz
Input SRC Performance:	>130 dB THD+N

Analog Audio Input/Output

Input Impedance:	>10 kΩ
Input Clip Level:	+24 dBu (eq. 0 dBFS)
Max Output Level:	+24 dBu (eq. 0 dBFS)
Freq. Response:	±0.12 dB (20 Hz to 20 kHz)
SNR:	115 dB (A weighted)
THD+N:	-96 dB (20 Hz to 10 kHz)
Crosstalk:	-106 dB (20 Hz to 20 kHz)

Analog Video Input

ADC bit depth:	12-bit
Sampling:	54 MHz (4X over-sampling)
Freq. Response:	Y/CVBS : ± 0.25 dB to 30 MHz Pb/Pr: ± 0.25 dB to 15.0 MHz
Noise:	< -60 dB to 30 MHz (unweighted)
Differential Phase:	< 1.5 degree
Differential Gain:	< 1

Analog Video Output

DAC Bit depth:	12-bit
Freq. Response:	Y/CVBS : ± 0.25 dB to 30 MHz Pb/Pr: ± 0.25 dB to 15.0 MHz
Noise:	< -60 dB to 30 MHz (unweighted)
Differential Phase:	< 1.5 degree
Differential Gain:	< 1 %

Fiber Input/Output

Connectors:	Dual LC, Standard Polish
Fiber Type:	9/125 micron, single mode
Mating system:	Blind mate
TX power:	-5 dBm @ 1310 nm
RX power:	-16 to -3 dBm / 1260 to 1620 nm

Power

9901	35 Watts (nominal)
9921, 9985, 9931	28 Watts (nominal)
The following options add power consumption as follows:	
· +KEYER option:	2 Watts (not available for 9931)
· +DEC (Dolby decoder) option:	2 Watts
· +ANA, +ANV (analog audio/video I/O) options:	15 Watts (typical)

GPI

Complement/Triggering:	Two; independent opto-isolated. Independent edge-triggered on H/L or L/H transition or combined logic considering both inputs (binary truth table)
Connector:	3-terminal Phoenix; GPI-1/GPI-2/COM
Mapping/Definition:	Selectable GPO true statement(s) activates selected GPO

GPO

Complement/Signalling:	Two, independent. Non- referenced SPST relay closure upon true condition(s).
Connector:	3-terminal Phoenix; GPI-1/GPI-2/COM
Mapping:	Selectable GPO true statement(s) activates selected GPO

Fusion3G DOLBY® OPTIONS



Fusion3G® is virtually unmatched in single-card Dolby® audio capacity and capabilities. Several Dolby options provide capacity that optimizes your operating costs, space requirements, and bandwidth economy. Powerful DSP features allow for same-card decoding and multiple-format encoding. Any or all Dolby options described here are simultaneously available on any same single Fusion3G® card.

DOLBY® E/DIGITAL/DIGITAL PLUS™ DECODING (+DEC OPTION)

Provides Dolby® E, Digital, and Digital Plus™ decode from AES or embedded sources. Decoder metadata can be outputted as SMPTE 2020 re-embedded, RS-485, or be applied to same-card encoders.

DOLBY® DIGITAL/DIGITAL PLUS™ ENCODING (+ENCD OPTION)

Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card (including upmixed and loudness-processed signals). Full metadata support using internally generated or external metadata via SMPTE 2020, RS-485, or from a same-card decoder.

Up to four independent encoders - all on the same card - can be included (+ENCDA thru +ENCDD), allowing for multiple-stream encoding that supports four languages on the same SDI stream. Independent encoders can support distinct coding modes and bit rates for each encoded pair.

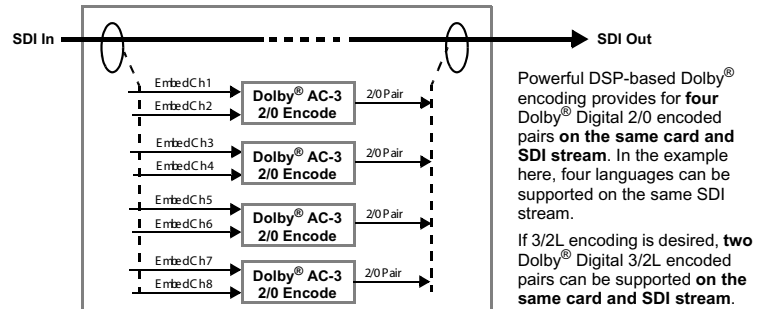
DOLBY® E ENCODING (+ENCE OPTION)

Provides Dolby® E encoding from any combination of audio sources supported by the card (including upmixed and loudness-processed signals). Full metadata support using internally generated or external metadata via SMPTE 2020, RS-485, or from a same-card decoder.

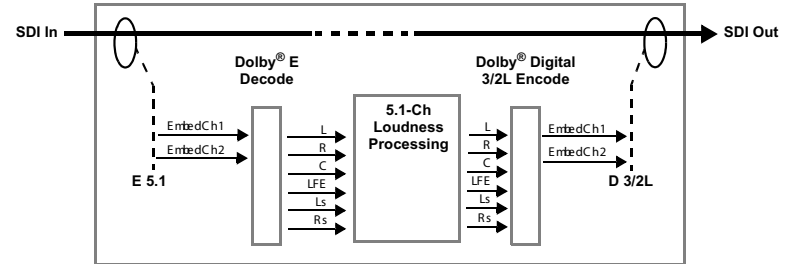
DOLBY® DESCRIPTIVE VIDEO SERVICES (DVS®) ENCODING (+ENC DVS OPTION)

Provides Dolby® Digital / Digital Plus™ encoding for all multi-channel program encoding modes along with integration of secondary descriptive audio channel (visually impaired narrative) in simple and advanced program audio ducking modes.

Encoding Multiple Dolby® Digital Streams On The Same Card / Same SDI Stream



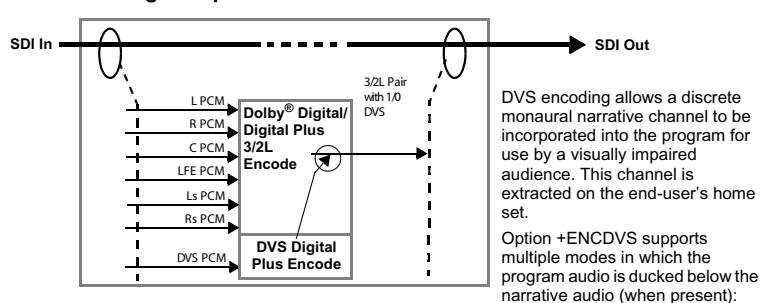
Dolby® E Decode-to-Digital Encode with Loudness Processing On The Same Card / Same SDI Stream



Same-card Dolby® E / Digital transcoding converts E5.1 audio back to card PCM baseband, allowing Linear Acoustic® AEROMAX™ loudness processing to be applied.

The encoder can choose from a complete set of built-in internal metadata, on-card decoder metadata, or external RS-485 or SMPTE 2020 metadata as desired.

DVS® Encoding Using Dolby® Digital Plus™ Encoding and Option +ENC DVS



- Simple Automatic ducks program audio when audio is present on the DVS narrative channel.
- Advanced Automatic ducks program audio in consideration of program audio loudness.
- Warble-Tone Mode provides a modulated signal that allows active post-production mixing of the program/DVS audio loudness proportion.

Dolby® encoder technology on this card is manufactured under license from Dolby Laboratories. DVS® is a registered trademark of WGBH Media Access Group. Loudness processor licensed feature uses AEROMAX™ algorithms provided under license from Linear Acoustic Inc. Linear Acoustic is a registered trademark of Linear Acoustic Inc.

THE FOLLOWING DOLBY® OPTIONS ARE AVAILABLE ON ALL FUSION3G® CARDS

+DEC Dolby Digital/Digital Plus/E Decoder

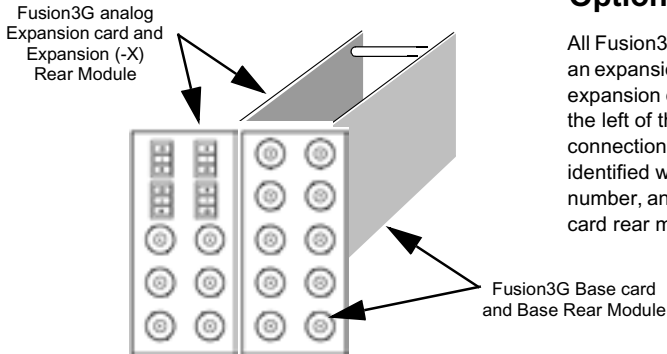
+ENCD Dolby Digital/Digital Plus Encoder. Encoder count is available as single encoder (+ENCDA) up to four encoders (+ENCDA thru +ENCDD). Contact sales for more information about multiple encoder details and limitations.

+ENCE Dolby E Encoder

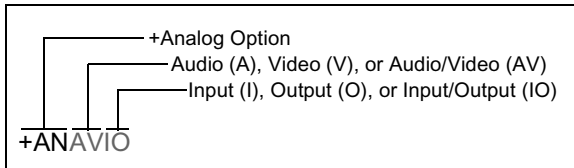
+ENC DVS DVS encoding option add-on for Dolby Digital Encoder

Fusion3G » ANALOG OPTIONS OVERVIEW

Fusion3G Analog Audio/Video I/O Options and Provisioning Details



All Fusion3G® analog audio and/or video input/output options use an expansion card that interfaces with a base Fusion3G card. This expansion card in turn uses an expansion rear module installed to the left of the base card (when viewed from the rear module connection side (rear of frame). Expansion rear modules are identified with an "X" in the part number, and can be mixed with base card rear modules types as desired.



Several choices are available when provisioning analog audio/video options to allow you the flexibility in purchasing and using frame space for only the interfaces you need. Cobalt uses a simple code for analog options which is used also for ordering analog I/O options.

+ANAIO – Analog Audio In/Out
Provides up to eight balanced analog audio ports which can be individually configured as inputs or outputs

Analog audio inputs or outputs via example rear module RM20-9901-XC.

Also usable with expansion rear modules:

RM20-9901	-XB
RM20-9921	-XB-HV
RM20-9931	-XD
RM20-9985	-XE
	-XF
	-XF-HV

+ANAVI – Analog Audio/Video In
Provides balanced analog audio inputs and component/composite analog video inputs

Analog audio and component/composite video inputs via example rear module RM20-9901-XD

Also usable with expansion rear modules:

RM20-9901	-XB
RM20-9921	-XB-HV
RM20-9931	-XE
RM20-9985	-XF
	-XF-HV

+ANAVO – Analog Audio/Video Out
Provides balanced analog audio outputs and component/composite analog video outputs

Analog audio and component/composite video outputs via example rear module RM20-9901-XF

Also usable with expansion rear modules:

RM20-9901	-XB
RM20-9921	-XB-HV
RM20-9931	-XE
RM20-9985	-XF-HV

+ANAVIO – Analog Audio/Video In/Out
Provides balanced analog audio I/O and component/composite analog video I/O

Analog audio and component/composite video I/O via example rear module RM20-9901-XB

Also usable with expansion rear modules:

RM20-9901	-XB-HV
RM20-9921	-XD
RM20-9931	-XE
RM20-9985	-XF
	-XF-HV

SPOTCHECK®)) TRANSPORT STREAM COMPLIANCE MONITOR

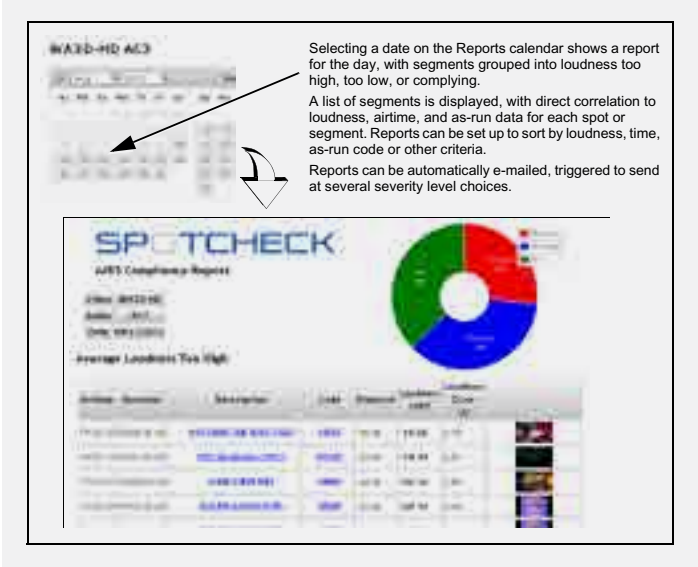
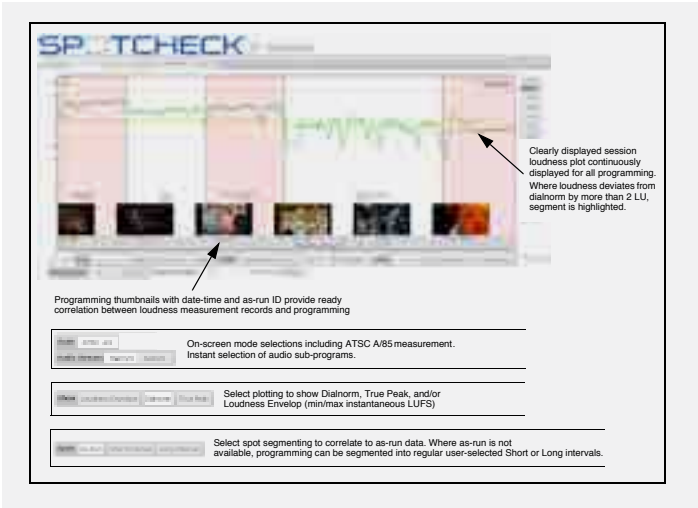


SpotCheck® provides easy to use, no-guesswork, automatic A/85 loudness measurement and access to all audio loudness records. Because SpotCheck® monitors an IP, ASI, or a transmitted over-the-air MPEG stream at the transmit (emission) encode point, SpotCheck® measures and logs loudness for all programming emanating from the facility.

Segments can be searched using date - time with the intuitive display of loudness plots along with date-time-stamped thumbnails of the actual corresponding programming, or can be queried and correlated with the facility as-run automation list. SpotCheck® readily pinpoints any segments that are out of CALM A/85 compliance, and conversely helps in documenting compliance should an erroneous complaint appear.

Options allow even more transport stream/programming analysis. Option QUALITYCHECK checks for the presence of CEA708/608 closed-captioning, as well as the string content text, and also can detect transport communication errors as well as frozen/black frame and audio silence, with Alert Manager sending these alerts to your designated personnel as simple e-mails. Option AIRCHECK provides easily managed lo-res proxy downloads of user-selected transport stream segments that can be sent and viewed over e-mail to recipients with common smart devices and media players.

Easy to use web user interface provides for easy setup and use. Requiring no breakout from the MPEG stream and not affecting the emission stream in any way, SpotCheck® provides an easily integrated, facility-based, superior solution for loudness records and compliance verification.



SPOTCHECK®)) TRANSPORT STREAM COMPLIANCE MONITOR

FEATURES

Automated 24/7 loudness measurement and logging for every programming segment sent as emission. Full CALM compliant logging and record access.

Easy data search by date/time range and as-run data allows rapid and no-hassle pinpointing to any programming segment

Support for sending loudness alert e-mails to multiple personnel. User-defined multiple-level severity escalation.

Straightforward display of actual loudness plot and clear OK/non-compliant tagging of programming segments – no tedious lists or spreadsheets to analyze

Full compatibility with MPTS and SPTS streams

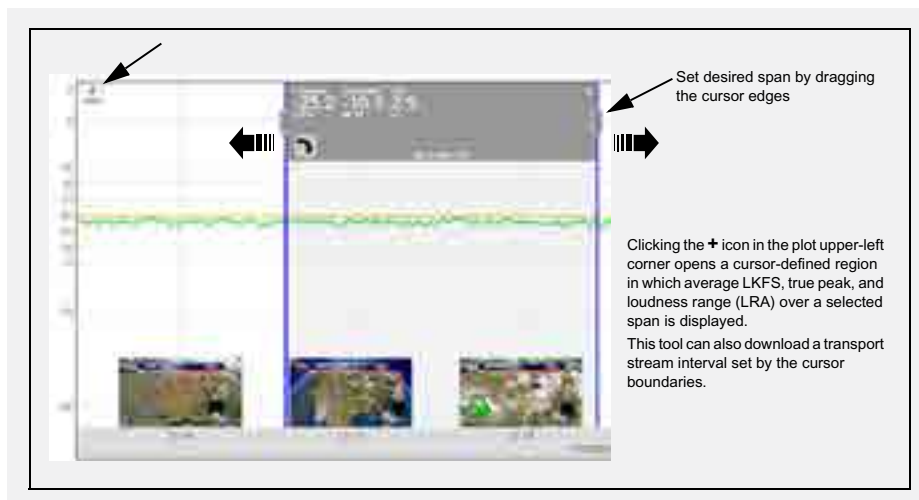
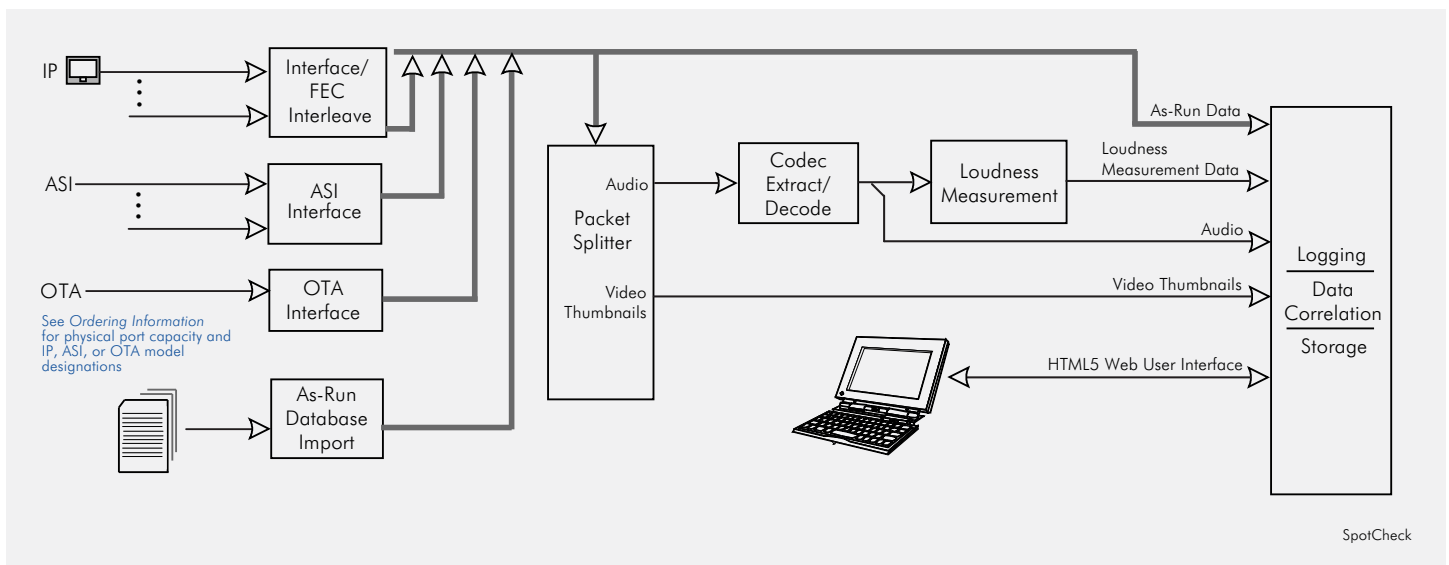
Direct GigE MPEG, ASI, or OTA interface. No complicated external breakout of signals.

Automatically accounts for program loudness, dialnorm, and DRC effect on audio – no interpretation of readings or loudness metadata needed

Three year warranty with extension options available

Robust product support – upgrades and enhancements field-installed via firmware upload from our Support web page

Cobalt Support Network feature provides, where desired, a direct VPN connection between your SpotCheck unit and our engineering support



SPOTCHECK® » TRANSPORT STREAM COMPLIANCE MONITOR

Current zoom span level

Zoom preset buttons

Jump go-to buttons

Navigating in thumbnail / loudness plots could not be easier.

- Zoom-out (more segments/time span displayed) or zoom-in (less segments/time span displayed but with greater detail) simply by rotating scroll wheel on mouse. Use Zoom presets to go to preset spans of 10 seconds to maximum. Zoom span level is always displayed in upper corner of plot.
- Navigate to most recent or earlier segments simply by dragging mouse left or right. Use buttons on bottom of plot to jump to earlier or later panes, or to go to very beginning or very end of plotting.

Transport Manager **Video Streams Grid** and **Video Streams List** show all programs and status/details within a transport stream. Clicking on a program opens a streaming thumbnail display showing status and real-time per-channel audio levels and details.

Each audio subprogram display has a Session tool in which a loudness session can be started and run for any interval to provide an instant evaluation of program loudness. Independent sessions can be run on any audio subprogram within a stream.

- Pressing **Reset** starts the session timer. At this point, session moving-average momentary LUFS, true peak, and LRA is displayed.
- Pressing **Reset** again clears the session data and starts a new session. A session can be run indefinitely, or as short as desired.

SPOTCHECK®)) TRANSPORT STREAM COMPLIANCE MONITOR

Option **QUALITYCHECK** detects transport communication errors as well as frozen/black frame and audio silence. It also checks for the presence of CEA708/608 closed-captioning.

At the moment an error occurs, the error display row highlights in red (then fades to the normal background color after a few seconds). This is useful for real-time monitoring and pinpointing troubleshooting of transport streams or programs experiencing problems.

Transport Stream/Program	View	Last Error	Triggered by Last Hour	Hourly History	Daily History
Transport Stream 1	View		17	[Chart]	[Chart]
Transport Stream 2	View		0	[Chart]	[Chart]
Transport Stream 3	View		0	[Chart]	[Chart]
Transport Stream 4	View		0	[Chart]	[Chart]
Transport Stream 5	View		25	[Chart]	[Chart]

Alert Manager

- Transport Error (Error)
- Audio Bulk (Error)
- Audio Silence (Error)
- Continuity Error (Error)
- RTT (Error)

Configuration for Transport Error (Error):

- Name: Transport Error (Error)
- Category: Error
- Severity: Error
- Enabled: [Checked]
- Send To: [List of email addresses]
- Send Interval: [Dropdown menu]
- Send Method: [Dropdown menu]
- Send Time: [Dropdown menu]
- Send Days: [Dropdown menu]
- Send Time Range: [Dropdown menu]
- Send Days Range: [Dropdown menu]
- Send Time Range Start: [Time field]
- Send Time Range End: [Time field]
- Send Days Range Start: [Day field]
- Send Days Range End: [Day field]
- Send Time Range Start/End: [Time field]
- Send Days Range Start/End: [Day field]
- Send Time Range Start/End: [Time field]
- Send Days Range Start/End: [Day field]
- Send Time Range Start/End: [Time field]
- Send Days Range Start/End: [Day field]

QUALITYCHECK Alert Manager allows transport and program error notification to be forwarded as e-mail to SpotCheck users by simply dragging the error notification into the user's mailbox.

Presence of CEA708 and/or CEA608 packets is indicated by the yellow **(CC) 708** or **(CC) 608** bands just above the thumbnail images. Zooming in tighter displays the closed-captioning text (which can be copied and pasted into a text file if desired).



SPOTCHECK®)) TRANSPORT STREAM COMPLIANCE MONITOR



)) SPECIFICATIONS

Physical

SpotCheck-1000

Power: 120/240 VAC, 50/60 Hz, 200 W (max)

Size: 1RU

Depth required: 24 in (61 cm) minimum

SpotCheck-2000

Power: 120/240 VAC, 50/60 Hz, 350 W (max)

Size: 1RU

Depth required: 24 in (61 cm) minimum

Transport Interface

SpotCheck-IP: GigE (1000 Base-T) via RJ-45

SpotCheck-ASI: ASI, 75Ω BNC input

SpotCheck-OTA: 8VSB (RF), female F-connector input

See Ordering Information for port complements and other information.

Loudness Measurement

ATSC A/85 -24 LKFS

Formats Supported

Transport: MPEG over IP or ASI, UDP, RTP, SMPTE 2022, FEC wrappers
 Multicast: Supports IPV4 multicast and IGMPv2 multicast management
 Audio Codecs Supported: Dolby® Digital (AC-3), Dolby® Digital Plus (E-AC-3)
 Video Codecs Supported: MPEG2
 As-run import: Imports as-run data from common automation systems via Windows Share or drop/drag into program as-run folders

Control/Monitor Interface

HTML5 web browser via dedicated 10/100/1000 Ethernet port.

Storage Capacity (per SpotCheck® Unit)

SpotCheck-1000, SpotCheck-2000
 12 months

)) ORDERING INFORMATION

SPOTCHECK®-1000-IP ATSC A/85 Compliance Monitor for IP Transport Streams. 1 Control IP Port, 1 Media IP Port. Includes one license of SPOTCHECK-LICENSE-AUDIO-FULL. Maximum capacity of four programs. 12-month analysis storage.

SPOTCHECK®-1000-ASI ATSC A/85 Compliance Monitor for ASI Transport Streams - 1 Control IP Port, 1 ASI Input Port. Includes one license of SPOTCHECK-LICENSE-AUDIO-FULL. Maximum capacity of four programs. 12-month analysis storage.

SPOTCHECK®-1000-OTA ATSC A/85 Compliance Monitor for OTA Transport Streams - 1 Control IP Port, 1 RF Input for over-the-air reception. Includes one license of SPOTCHECK-LICENSE-AUDIO-FULL. Maximum capacity of four programs. 12-month analysis storage.

SPOTCHECK®-2000 ATSC A/85 Compliance Monitor for IP Transport Streams - 1 Control IP Port, 5 Media IP Ports (ASI support available using option OPT-ASI; 1 ASI port max.). Includes four licenses of SPOTCHECK-LICENSE-AUDIO-FULL. Maximum capacity of 16 programs. 1RU. PSU redundancy. Dual power RAID hard drive configuration. 12-month analysis storage.

OPT-ASI Adds a 75Ω BNC ASI input and setup interface to any SpotCheck model.

OPT-OTA Adds an RF OTA input and setup interface to any SpotCheck model.

)) ADDITIONAL PROGRAM LICENSES

SPOTCHECK®-LICENSE-AUDIO-FULL Complete program analysis for one program (1 video PID plus 2 audio PIDs). Each optional additional license adds complete analysis for one program.

SPOTCHECK®-LICENSE-AUDIO-LITE Program analysis for one program (1 video PID plus 1 audio PID), but omits As-Run support.

SPOTCHECK®-LICENSE-AUDIO-SUBPROGRAM Adds an additional audio subprogram (one audio PID, such as DVS or SAP) to a FULL or LITE program license. (Available only in conjunction with an already-provisioned SpotCheck®-LICENSE-AUDIO-FULL or SpotCheck®-LICENSE-AUDIO-LITE program license.)

SPOTCHECK®-LICENSE-QUALITYCHECK Adds CEA 708/608 presence detect and stream/program quality checks. (Option is available on a unit basis (one license (max.)); adds QUALITYCHECK to entire unit, with all transport streams accommodated).

SPOTCHECK®-LICENSE-AIRCHECK Adds transport stream lo-res proxy download. (Option is available on a per-program basis).

SpotCheck® Licensing

Adding licenses to SpotCheck® allows scalable provisioning above the standard capacity as shown in this example.



LMNTS®



LMNTS® (Loudness Management for n-Transport Streams) is a first in comprehensive transport-based loudness processing. LMNTS® represents a new level in multi-stream loudness processing integration ease, economy, confidence, and consistency. Operating at the MPEG transport layer, LMNTS® provides a practical loudness management solution for MVPD operators without the need or complexity of external codecs transferring between baseband and MPEG interfaces.

LMNTS®-1000

Supports up to 80 surround audio PIDs

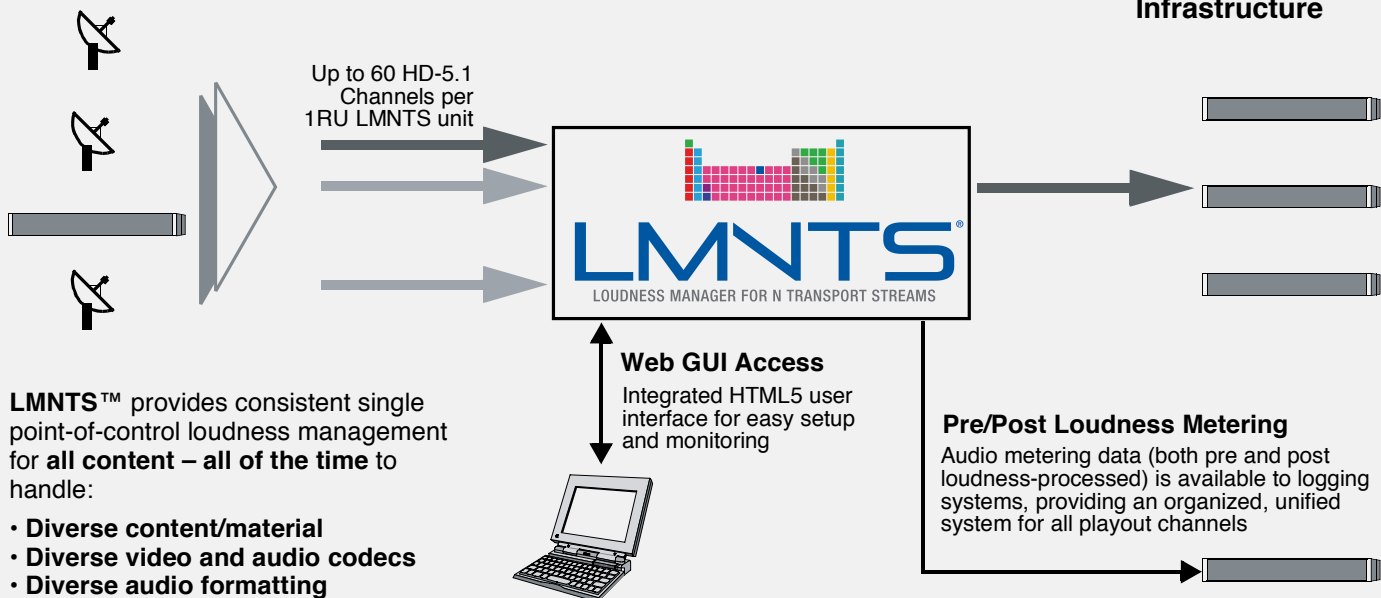
LMNTS®-2000

Supports up to 120 surround audio PIDs



Diverse Content Transport Streams from IRDs, Fiber, etc.

Consistent-Loudness Transport Streams To Transmission Infrastructure



LMNTS™ provides consistent single point-of-control loudness management for all content – all of the time to handle:

- Diverse content/material
- Diverse video and audio codecs
- Diverse audio formatting

Using unique depacketing/repackaging processing and decode/re-encode, LMNTS® extracts and decodes audio codec packets from the program stream, performs high-quality PCM loudness processing, and then re-encodes and re-packets the audio with its stream. An ASI option provides additional ASI transport stream support. Physically, all data connection to LMNTS® is via GigE IP or ASI interfaces using an industry-standard IT hardware platform with no intermediary breakouts.

Because LMNTS® uses the same high-quality Linear Acoustic® Aeromax™ loudness processing for each stream, perfect loudness consistency is assured for all programming passing through the system. For AC-3 streams, LMNTS can accommodate varying received loudness and dialnorm, and repackage the audio using consistent loudness and consistent re-authored dialnorm for perfect loudness matching for all programming.

LMNTS® is fully scalable, with licenses available to progressively add the number of audio programs accommodated.



LMNTS®

FEATURES

Unmatched integration ease and practicality for multi-stream head-end loudness processing. LMNTS®-IP version directly interfaces with GigE-based playout servers.

Consistent, uniformly controlled loudness processing across all program channels (including interstitials). Loudness processing performed in PCM domain.

Post-processed AC-3 is re-encoded using re-authored matching dialnorm across all programming

Integrated HTML5 user interface for easy setup and local or remote monitoring

Full compatibility with MPTS and SPTS streams

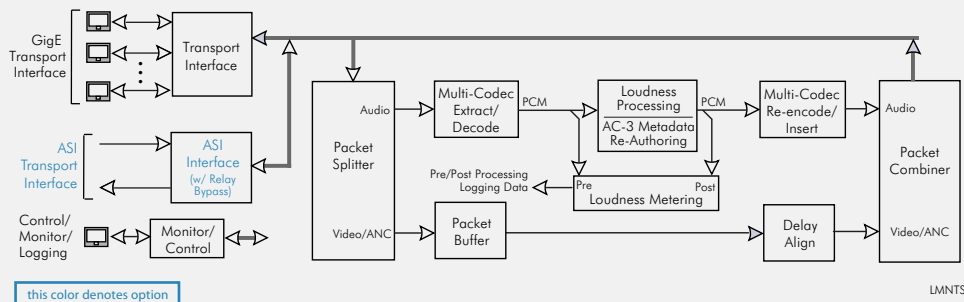
ASI option provides ASI transport stream processing

Fully scalable solution using licensing to support desired number of audio programs required

Integrated video/audio delay re-alignment compensates for any internal processing delays

Low delay latency (500 msec)
Transparent processing maintains payload size and video/audio quality. No added re-compression or de-compression.

Three year warranty with extension options available



SPECIFICATIONS

Physical

LMNTS-500
Power: 120/240 VAC, 50/60 Hz, 350 W (max)
Size: 1RU
Depth required: 24 in (61 cm) minimum

LMNTS-1000
Power: 120/240 VAC, 50/60 Hz, 550 W (max)
Size: 1RU
Depth required: 24 in (61 cm) minimum

LMNTS-2000
Power: 120/240 VAC, 50/60 Hz, 750 W (max)
Size: 2RU
Depth required: 24 in (61 cm) minimum

Interface

IP Transport: GigE (1000 Base-T) via RJ-45
ASI Transport (Optional; LMNTS-OPT-ASI-1X1): ASI/I/O, 75Ω BNCs with relay bypass

Capacity

LMNTS-500
Data throughput: (3) GigE (1000 Base-T) RJ-45 Media Ports
Channel capacity: (10) 5.1 HD channels, (20) 2.0 HD or SD channels
Processing latency delay: 500 msec

LMNTS-1000
Data throughput: (5) GigE (1000 Base-T) RJ-45 Media Ports
Channel capacity: (60) 5.1 HD channels, (100) 2.0 HD or SD channels
Processing latency delay: 500 msec

LMNTS-2000
Data throughput: (5) GigE (1000 Base-T) RJ-45 Media Ports
Channel capacity: (100) 5.1 HD channels, (140) 2.0 HD or SD channels
Processing latency delay: 500 msec

Note: Channel capacities above are maximum capacities. Practical capacity is a function of licenses added.

Format Supported

Transport: MPEG over IP or ASI, UDP, RTP,
Multicast: Supports IPV4 multicast and IGMPV2/V3 multicast management
Audio Codecs: Dolby® Digital (AC-3), Dolby® Digital Plus™ (E-AC-3), MPEG 1 Layer 2, AAC
Video Codecs: Supports all video codecs; video passed without alteration

Control/Monitoring

HTML5 web browser via dedicated 10/100/1000 Ethernet port

ORDERING INFORMATION

LMNTS-500 Transport Stream Loudness Processor, 1RU, (10) 5.1-channel capacity, (20) 2.0-channel capacity. 1 Control IP Port, 3 Media IP Ports.

LMNTS-1000 Transport Stream Loudness Processor, 1RU, (60) 5.1-channel capacity, (100) 2.0-channel capacity. 1 Control IP Port, 5 Media IP Ports.

LMNTS-2000 Transport Stream Loudness Processor, 2RU, (100) 5.1-channel capacity, (140) 2.0-channel capacity. 1 Control IP Port, 5 Media IP Ports.

LMNTS-OPT-ASI-1X1 Adds one ASI input and output to any LMNTS unit

LMNTS-LICENSE-E-AC-3-SURROUND Loudness processing license for one stream (one PID) of 5.1 (surround) Dolby Digital Plus (EAC-3). Can also be used to process Dolby Digital (AC-3)

LMNTS-LICENSE-E-AC-3-STEREO Loudness processing license for one stream (one PID) of 2.0 (stereo) Dolby Digital Plus (EAC-3). Can also be used to process Dolby Digital (AC-3)

LMNTS-LICENSE-AC-3-SURROUND Loudness processing license for one stream (one PID) of 5.1 (surround) Dolby Digital (AC-3)

LMNTS-LICENSE-AC-3-STEREO Loudness processing license for one stream (one PID) of 2.0 (stereo) Dolby Digital (AC-3)

LMNTS-LICENSE-AAC-SURROUND Loudness processing license for one stream (one PID) of 5.1 (surround) AAC-LC or HE-AACv1

LMNTS-LICENSE-AAC-STEREO Loudness processing license for one stream (one PID) of 2.0 (stereo) AAC-LC or HE-AACv1

LMNTS-LICENSE-MP1L2 Loudness processing license for one stream (one PID) of MPEG 1 Layer II

Note: A 5.1 (surround) license can be used to process a 2.0 (stereo) stream of the same codec type.

OGCP-9000 » REMOTE CONTROL PANEL

for Fusion3G®/COMPASS® Cards

OPTIONS

Loudness Metering (+LM-P)



The award-winning OGCP-9000 offers instantly available, simplified card control using individual control knobs that act just like level controls or selector switches. Each control setting is displayed on the adjacent display. The OGCP-9000 works with all Fusion3G® 9900 and COMPASS® 9000 series signal processing cards.

Communication with the openGear® frame occurs over an optimized high-speed openGear® Ethernet control protocol, allowing lightning-fast access. The OGCP-9000 offers instantaneous, real-time adjustments, so operators can manipulate on-air signals with confidence and precision.

An easy to use keypad enables intuitive access with minimal submenus. For any card, only one level of submenus is needed to access all of its functions. Station engineers can configure the panel to restrict availability of specific cards and parameters for operation. Configuration is done through a simple web interface, where configurations can be exported, backed up, and re-imported easily. The OGCP-9000 works seamlessly with DashBoard™ control software--any changes made with either system are instantly reflected on the other.

The control panel is optimized for both bright and low light environments. Two large format, super-bright, wide-angle color LCD screens show sharp and clear text; operators can select either a white or black background. Other features include a fully backlit keypad and user-adjustable LED back light.

» FEATURES

Simultaneous display and update of 8 parameters	Save and restore panel configuration with web interface and USB drive	Seamless integration with DashBoard™ remote control software
Real time adjustments, excellent for on-air manipulation	10/100 Mbpts Ethernet TCP/IP connection	Rugged 2RU rack mounted chassis
No deep submenus, all parameters can be accessed quickly	Optimized for bright and low light environments	Five-year warranty
Completely configurable with password protected web interface		

» SPECIFICATIONS

Power 9 watts	Ethernet 10/100 Mbps with Auto-MDIX on RJ45 socket with DC isolation	To allow you to provision loudness metering on a card-by-card and panel-by-panel basis suiting your needs, host cards and control panels use individual co-licenses. Co-licenses are required on both the host card(s) and Control Panel(s) , with card +LM-C co-licenses and panel +LM-P co-licenses comprising the overall option.
AC Input IEC C14 Chassis Plug accepting 90-264 VAC @ 47-63 Hz	LCD 500 cd/m2 (nits) of brightness, 300:1 contrast ratio, 120 degree viewing angle	
DC Input 12 VDC 1.0 A	Size Standard 2RU; 5" depth	
<p>Example 2 cards each with a +LM-C co-license 1 Control Panel with a +LM-P co-license</p>		

» ORDERING INFORMATION

OGCP-9000 2RU Remote Control Panel for Fusion3G®/COMPASS® Cards
(Specify country of destination for power cord)

+LM-P Audio Loudness Metering software co-license for OGCP-9000.
(Each card to be used with loudness metering also requires an individual card co-license (+LM-C). See respective card Ordering Information for availability.)

OGCP-9000/CC » REMOTE CONTROL PANEL

for Color Correctors and Fusion3G®/COMPASS® Cards



The OGCP-9000/CC offers instantly available, simplified card control using individual control knobs that act just like level controls or selector switches. Each control setting is displayed on the adjacent display. The OGCP-9000/CC is especially suited for the 9980-CSC-3G, 9064 and 9084 Color Corrector cards, and the Fusion3G® cards with +COLOR option, with controls and displays specifically designed for RGB color management.

Communication with the openGear® frame occurs over the optimized high-speed openGear® Ethernet control protocol, allowing lightning-fast access. The OGCP-9000/CC offers instantaneous, real-time adjustments, so operators can manipulate on-air signals with confidence and precision. Rotary controls allow direct access to gain, gamma, and black for each of the RGB channels, in addition to YCbCr proc controls.

An easy to use keypad enables intuitive access with minimal submenus. For any card, only one level of submenus to access all of its functions. Station engineers can configure the panel to restrict availability of specific cards and parameters for operation. Configuration is done through a simple web interface, where configurations can be exported, backed up, and re-imported easily. The OGCP-9000/CC works seamlessly with DashBoard™ control software. Any changes made with either system are instantly reflected on the other.

The control panel is optimized for both bright and low light environments. A large format, super-bright, wide-angle color LCD screen shows sharp and clear text; operators can select either a white or black background. Other features include a fully backlit keypad and user-adjustable LED back light.

» FEATURES

Designed for Color Correctors but functional for all Cobalt cards	Completely configurable with password protected web interface	Optimized for bright and low light environments	Five-year warranty
Real time adjustments, excellent for on-air manipulation	Save and restore panel configuration with web interface and USB drive	Seamless integration with DashBoard™ remote control software	
No deep submenus, all parameters can be accessed quickly	10/100 Mbps Ethernet TCP/IP connection	Rugged 2RU rack mounted chassis	

» SPECIFICATIONS

Power 9 watts <hr/> AC Input IEC C14 Chassis Plug accepting 90-264 VAC @ 47-63 Hz <hr/> DC Input 12 VDC 1.0 A	Ethernet 10/100 Mbps with Auto-MDIX on RJ45 socket with DC isolation <hr/> Inputs/Outputs 12 General Purpose Inputs 16 General Purpose Outputs 2 USB 2.0 Ports RS232 Serial Port RS422 Serial Port RS485 Serial Port	LCD 500 cd/m2 (nits) of brightness, 300:1 contrast ratio, 120 degree viewing angle <hr/> Size Standard 2RU; 5" depth
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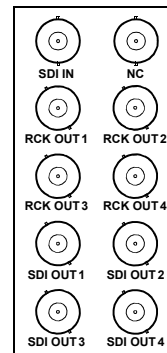
» ORDERING INFORMATION

OGCP-9000/CC 2RU Remote Control Panel for 9084 Color Corrector and Fusion3G®/COMPASS® Cards (Specify country of destination for power cord)	9980-CSC-3G 3G/HD/SD-SDI RGB color space corrector/framesync with Integrated Test Signal Generator & OGCP-9000/CC Control Panel Support	9064 Up/Down/Cross Converter with HD/SD-SDI Input, RGB Color Corrector, Frame Sync <hr/> 9084 HD/SD-SDI RGB Color Corrector with YCbCr Video Proc and Frame Synchronization
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9071 » HD/SD-SDI AFD CODE INSERTER



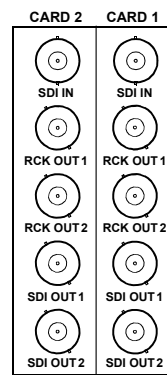
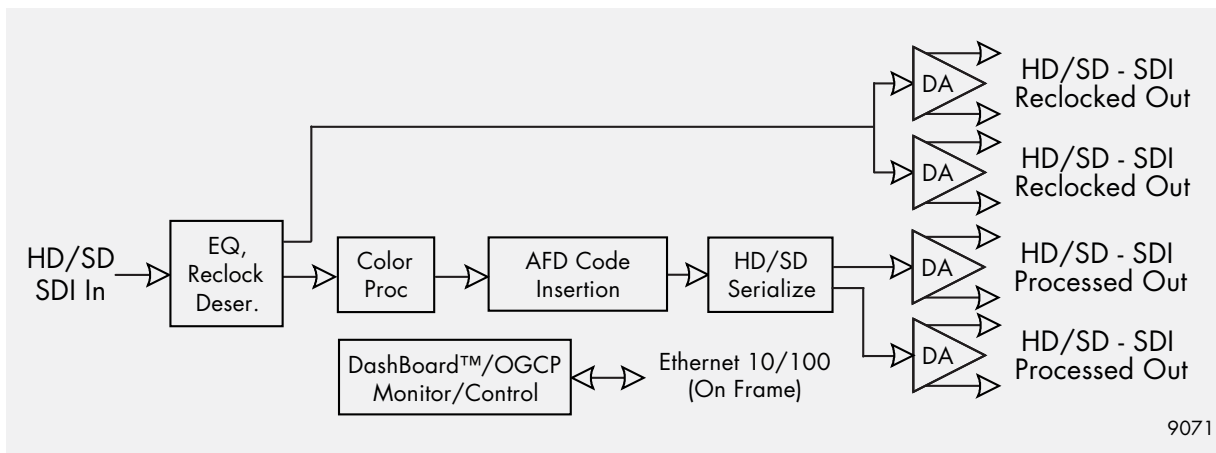
The 9071 provides cost-effective HD/SD-SDI AFD code insertion. AFD codes can be applied, even if there is no code detected on the input. The output line for the AFD code can also be selected. For video input already having a code, the AFD code can be changed as desired. All video, audio, closed captioning and timecode data is passed through the card.



RM20-9071-A

» FEATURES

HD/SD digital inputs	16 user presets	Remote control/monitoring via DashBoard™ software or OGCP-9000 control panel	Five-year warranty
AFD code insertion			



RM20-9071-A/S

9071

» SPECIFICATIONS

Electrical

Power: 8 watts

HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 292 and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz

Processing Delay

Total Delay: < 3.2 μs

HD/SD-SDI Output

Number of outputs: 4 reclocked
 4 processed
 Standard: SMPTE 292 and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz
 Jitter: HD: < 0.15 UI
 SD: < 0.10 UI
 Embedded Audio: 16-Ch SD/HD (passthrough)

» ORDERING INFORMATION

9071 HD/SD-SDI AFD Code Inserter

RM20-9071-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 SDI Reclocked Outputs, 4 SDI Processed Outputs

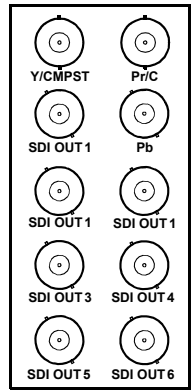
RM20-9071-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input, 2 SDI Reclocked Outputs per card, 2 SDI Processed Outputs per card



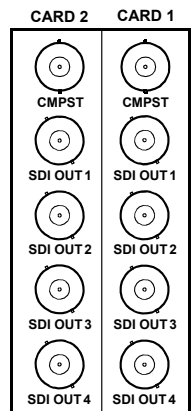
9021 » STANDARD DEFINITION A/D ANALOG COMPOSITE, Y/C, COMPONENT TO 10-BIT SDI



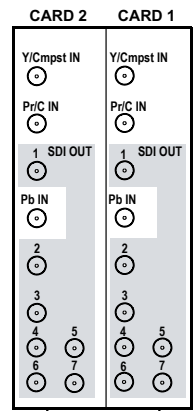
The 9021 provides 10-bit analog-to-SDI conversion for NTSC and PAL SD conversions. When used with an “-A/S” (split) rear module, the space-saving design of the 9021 provides for high density, allowing two cards to be collocated in the same frame space normally occupied by a single card. The 9021 accepts composite, Y/C and component YPbPr analog input signals and provides an SMPTE 259M-C 270 Mbps SDI output. Differential inputs are included for common mode noise rejection. A 4-, 3-, or 2-line comb or notch filter is user-configurable for Y/C separation in composite mode. All modes have 2X 8:4:4 input oversampling. An output jitter VCXO reduces 270 Mbps jitter down to 2 Hz. Full video processing control with user memory allows adjustment of white level, black level, color gain, and color phase.



RM20-9021-A



RM20-9021-A/S



RM20-9021-B/S-DIN-HDBNC

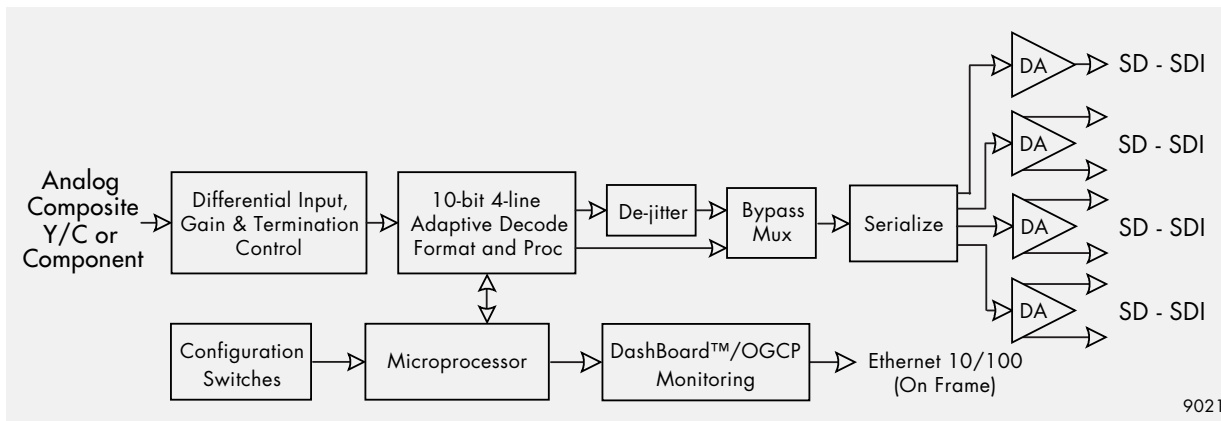
» FEATURES

Composite, component YPbPr and Y/C inputs
 Supports component BetaCam™, MII™ and SMPTE/N10
 Differential analog video inputs for power hum rejection

10-bit A to D and digital video path
 User selectable (on/off) 75Ω termination
 4 or 3-line adaptive comb filter for composite mode

Seven 270 Mbit SDI outputs
 Internal color bar generator
 User processing configuration control

Manual or automatic input gain control
 Remote monitoring via DashBoard™ software or OGCP-9000 remote control panel
 Five-year warranty



» SPECIFICATIONS

Electrical
 Power: 7 watts

Input
 SD Composite, Y/C or Component (YPbPr); differential

SD-SDI Outputs-Outputs
 Number of Outputs: 7
 Standard: SMPTE 259M-C

Analog Gain
 Auto or manual mode

Output Jitter
 < 0.14 UI measured with color bar input

A/D Process
 8:4:4 2X over sampled

Frequency Response
 5 MHz +/- 0.25 dB

SNR
 > 52 dB

Comb Filter
 4, 3 or 2-line adaptive / non-adaptive (user selectable)

» ORDERING INFORMATION

9021 Standard Definition A/D (Composite, Y/C, or Component Input) to 10-bit SD-SDI

RM20-9021-A 20-Slot Frame Rear I/O Module (Standard Width) Composite, Component and Y/C Inputs, 7 Converted SDI Outputs

RM20-9021-A/S 20-Slot Frame Rear I/O Module (Split) Dual Composite In, 4 SDI Outputs per card

RM20-9021-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split, High Density) Composite, Component and Y/C Inputs, 7 SDI Outputs (per card; all connectors HD-BNC)

RM20-9021-B/S-DIN 20-Slot Frame Rear I/O Module (Split, High Density) Composite, Component and Y/C Inputs, 7 SDI Outputs (per card; all connectors DIN 1.0/2.3)



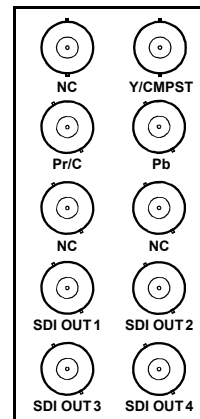
9031 » HD/SD 12-BIT ANALOG TO DIGITAL CONVERTER with Universal Inputs

OPTIONS

9031-SD SD Only 12-bit Analog to Digital Converter



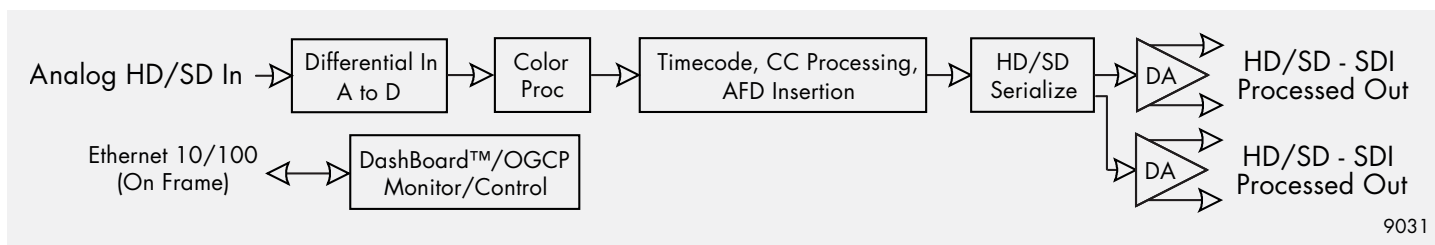
The 9031 provides analog-to-SDI conversion for HD and SD sources, with 12-bit conversion bit depth. The 9031 includes a full processing control (with user memory) that allows adjustment of white level, black level, color gain, and color phase. Also included is AFD code insertion. Factory presets enable a return to factory settings.



RM20-9031-A

» FEATURES

HD/SD analog to SDI conversion	Differential analog video inputs for power hum rejection	AFD code insertion	Remote control/monitoring via DashBoard™ software or OGCP-9000 control panel
HD/SD closed captioning support and flexible timecode processing	5-Line adaptive comb filter for SD-Composite mode	Video processing controls	Five-year warranty
		16 user presets	



9031

» SPECIFICATIONS

Electrical Power: 10 watts	Processing A/D Conversion: HD: 4:4:4 SD: 8:8:8 Quantization: 12-bit A to D and 10-bit video data path SD Comb Filter: 5-line adaptive Freq. Response: HD: Y - 0-25 MHz +/- 0.3 dB HD: Pb, Pr 0-13.5 MHz +/- 0.3 dB SD: 5.2 MHz +/- 0.25 dB	HD/SD-SDI Output Number of Outputs: 4 processed Standard: SMPTE 292 and 259M Signal Level: 800 mV nominal Return Loss: >15 dB at 5 MHz - 270 MHz >12 dB at 270 MHz - 1.485 GHz Jitter: HD: < 0.15 UI SD: < 0.10 UI
Analog Video Input HD Standard: YPbPr or RGB SMPTE SD Standard: Composite, Y/C or Component (YPbPr BetaCam™, MII™ or SMPTE/N10) Impedance: 75 Ω		

» ORDERING INFORMATION

9031 HD/SD 12-bit Analog to Digital Video Converter	9031-SD SD Only 12-bit Analog to Digital Video Converter	RM20-9031-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD Analog Inputs, 4 HD/SD-SDI Outputs
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9032 » HD/SD 12-BIT ANALOG TO DIGITAL CONVERTER

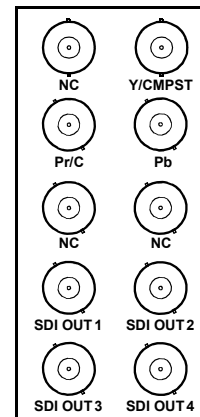
with Universal Inputs and Frame Sync

OPTIONS

9032-SD SD Only 12-bit Analog to Digital Video Converter with Frame Sync



The 9032 provides analog-to-SDI conversion for HD and SD sources, with 12-bit conversion bit depth. Also included is frame sync with user video/audio timing offset controls. The 9032 includes full processing control, frame sync controls, and AFD code insertion – all with user memory. Frame sync can be used to delay the video. Factory presets enable a return to factory settings.



RM20-9032-A

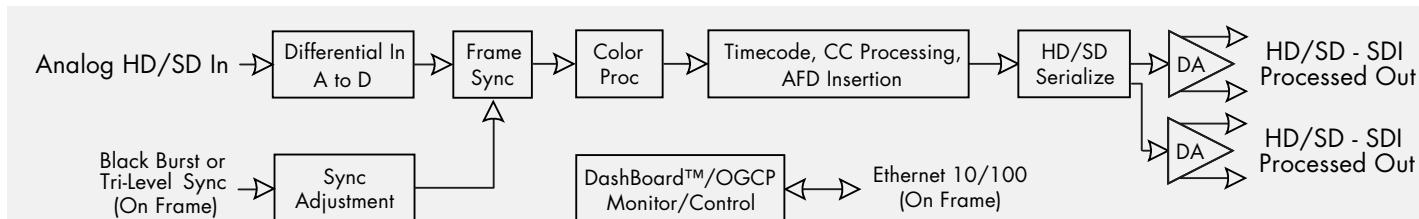
» FEATURES

HD/SD analog to SDI conversion
 HD/SD closed captioning support and flexible timecode processing
 Differential analog video inputs for power hum rejection

5-Line adaptive comb filter for SD-Composite mode AFD code insertion
 Frame sync with up to 13 frames of user adjustable delay

Video processing controls
 16 user presets

Remote control/monitoring via Dashboard™ software or OGCP-9000 control panel
 Five-year warranty



9032

» SPECIFICATIONS

Electrical

Power: 10 watts

Analog Video Input

HD Standard: YPbPr or RGB SMPTE
 SD Standard: Composite, Y/C or Component (YPbPr BetaCam™, MII™ or SMPTE/N10)
 Impedance: 75 Ω

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
 Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Processing

A/D Conversion: HD: 4:4:4 SD: 8:8:8
 Quantization: 12-bit A to D and 10-bit video data path
 SD Comb Filter: 5-line adaptive
 Freq. Response: HD: Y - 0-25 MHz +/- 0.3 dB
 HD: Pb, Pr 0-13.5 MHz +/- 0.3 dB
 SD: 5.2 MHz +/- 0.25 dB

Processing Delay

Minimum Frame Sync Delay: < 3 lines

HD/SD-SDI Output

Number of Outputs: 4 processed
 Standard: SMPTE 292 and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz
 Jitter: HD: < 0.15 UI
 SD: < 0.10 UI

» ORDERING INFORMATION

9032 HD/SD 12-bit Analog to Digital Video Converter with Frame Sync

9032-SD SD Only 12-bit Analog to Digital Video Converter with Frame Sync

RM20-9032-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD Analog Inputs, 4 HD/SD-SDI Outputs

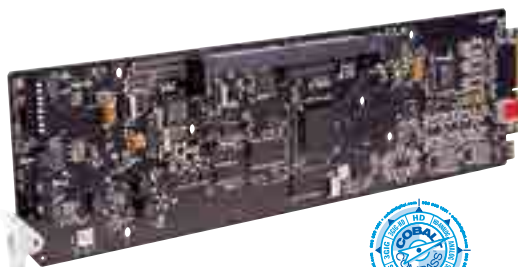


9033 » INPUT PROCESSING ANALOG TO DIGITAL VIDEO

with Audio Embedding

OPTIONS

Dolby® Digital/E Decoding (+DEC), Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM) 9033-SD SD Only 12-bit Analog to Digital Video Converter with Audio Embedding

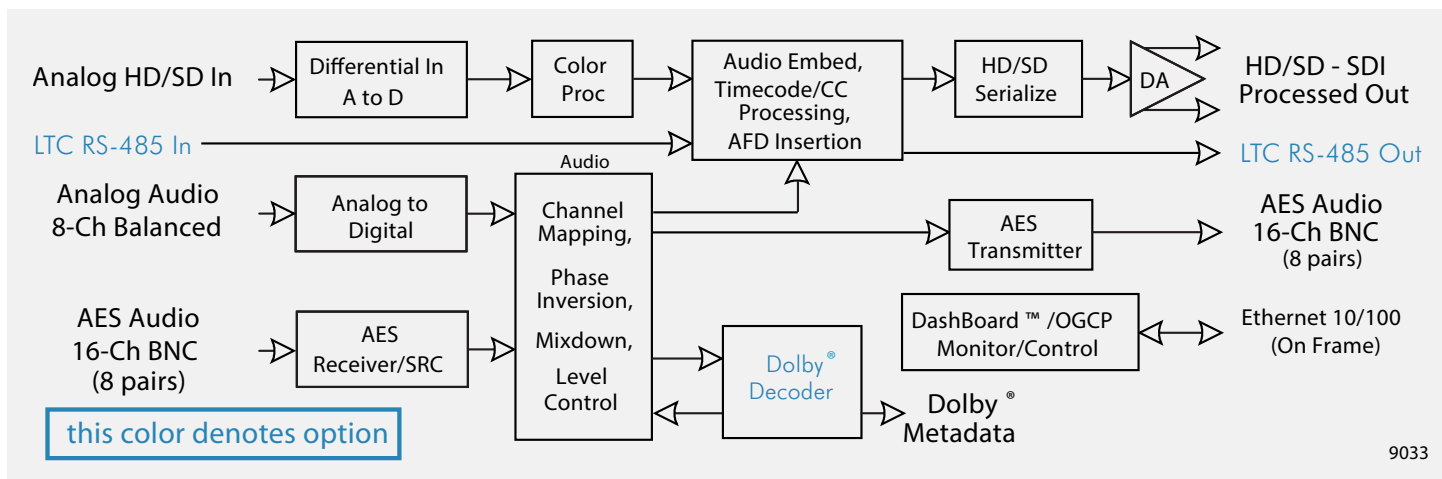


The 9033 provides analog-to-SDI conversion for HD and SD sources, with 12-bit conversion bit depth. Additionally, the 9033 provides audio embedding with a crosspoint that accepts up to 16 channels of discrete AES audio, and up to 8 channels of balanced analog audio.

The 9033 allows AFD code insertion, closed captioning and timecode insertion from VITC waveform (SD). The 9033 includes full video processing control with user memory and audio routing controls. Factory presets enable a return to factory settings.

» FEATURES

HD/SD analog to SDI conversion	Timecode conversion from SD VITC waveform to SD ATC_VITC. +LTC option accommodates LTC timecode input from balanced analog audio, AES, or RS-485 deck/playout sources, with HD/SD insertion/conversion to VANC waveform or packet-based VITC/LTC SDI formats	24-bit analog audio conversion	Dolby® Digital/E Decoder option with metadata output
Differential analog video inputs for power hum rejection	Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding	24-bit audio embedding	16 user presets
5-Line adaptive comb filter for SD-Composite mode		Audio channel mapping, downmixing, and level control	Remote control/monitoring via DashBoard™ software or OGCP-9000 control panel
Video processing controls		HD/SD closed captioning support and flexible timecode processing	Five-year warranty
Analog and AES audio inputs and AES output		AFD code insertion	



9033

» ORDERING INFORMATION

9033 HD/SD 12-bit Analog to Digital Video Converter with Audio Embedding

9033-SD SD Only 12-bit Analog to Digital Video Converter with Audio Embedding

RM20-9033-A 20-Slot Frame Rear I/O Module (Standard Width) Analog Video Input, 4 AES In/Out BNCs, and 2 SDI Output BNCs

RM20-9033-B 20-Slot Frame Rear I/O Module (Standard Width) Analog Video Input, 4 Analog Audio Inputs, and 2 SDI Output BNCs

RM20-9033-C 20-Slot Frame Rear I/O Module (Double Width) Analog Video Input, 2 AES In BNCs, 4 AES In/Out BNCs, 8 Analog Audio Inputs, and 2 SDI Output BNCs

RM20-9033-D 20-Slot Frame Rear I/O Module (Double Width) Analog Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 6 AES Out BNCs, and 2 SDI Output BNCs

RM20-9033-E-DIN 20-Slot Frame Rear I/O Module (Standard Width, High-Density) Analog Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors DIN1.0/2.3)

RM20-9033-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, High-Density) Analog Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors HDBNC)

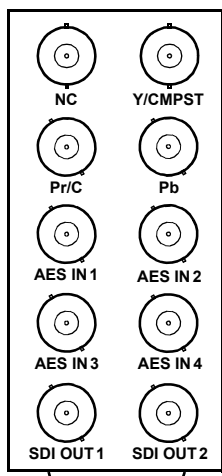
RM20-9033-F 20-Slot Frame Rear I/O Module (Double Width) Analog Video In, 4 AES In/Out BNCs, 8 Analog Audio In, RS-485 LTC / Metadata I/O Port, and 2 SDI Output BNCs



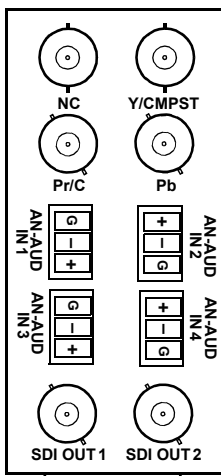
LINEAR ACOUSTIC



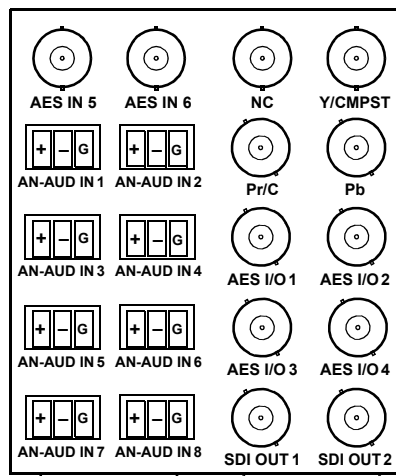
9033



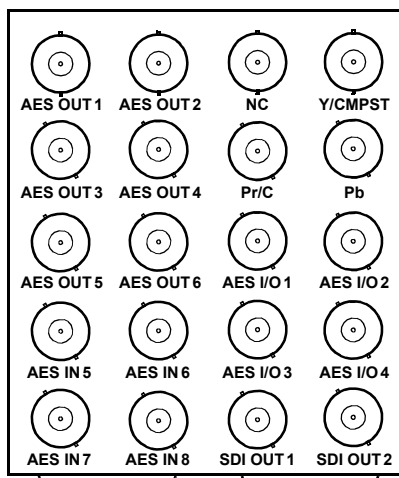
RM20-9033-A



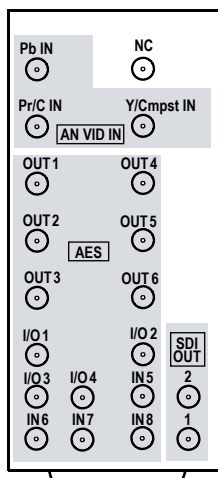
RM20-9033-B



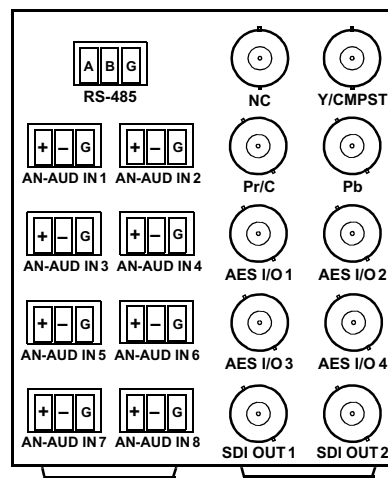
RM20-9033-C



RM20-9033-D



RM20-9033-E-DIN-HDBNC



RM20-9033-F

» SPECIFICATIONS

Electrical

Power: 12 watts
 Power (Dolby® +DEC Option): 14.5 watts

Analog Video Input

HD Standard: YPbPr or RGB SMPTE
 SD Standard: Composite, Y/C or Component (YPbPr BetaCam™, MII™ or SMPTE/N10)
 Impedance: 75 Ω

AES Input

Number of Inputs: 16-Ch unbalanced BNC (nominal 48 kHz only)
 Impedance: 75 Ω
 Input Level: 0.1 V to 2.5 V p-p (5 V p-p tolerant)
 Resolution: 24-bit

Analog Audio Input

Number of Inputs: 8-Ch balanced
 Connector: Removable 3-pin Phoenix
 Signal Level: up to +24 dBu
 Sample Rate: 48 kHz

Processing

A/D Conversion: HD: 4:4:4 SD: 8:8:8
 Quantization: 12-bit A to D and 10-bit video data path
 SD Comb Filter: 5-line adaptive

AES Output

Number of Outputs: 16-Ch unbalanced BNC
 Impedance: 75 Ω
 Sample Rate: 48 kHz
 Resolution: 24-bit

HD/SD-SDI Output

Number of Outputs: 2
 Standard: SMPTE 292 and 299M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz
 Jitter: HD: < 0.15 UI
 SD: < 0.10 UI
 Embedded Audio: 16-Ch SD/HD

9034 » INPUT PROCESSING ANALOG TO DIGITAL VIDEO

with Audio Embedding and Frame Sync

OPTIONS

Dolby® Digital/E Decoding (+DEC), Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM) 9034-SD SD Only 12-bit Analog to Digital Video Converter with Audio Embedding and Frame Sync

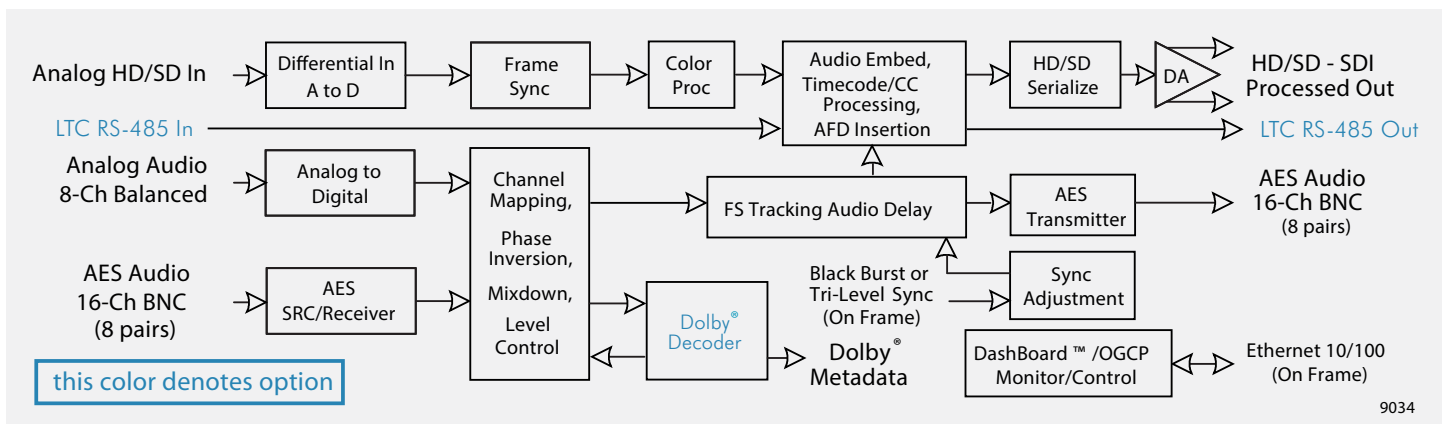


The 9034 provides analog-to-SDI conversion for HD and SD sources, with 12-bit conversion bit depth. Additionally, the 9034 provides frame sync and audio embedding with a crosspoint that accepts up to 16 channels of discrete AES audio, and up to 8 channels of balanced analog audio.

The 9034 allows AFD code insertion, closed captioning and timecode insertion from VITC waveform (SD). The 9034 includes full video processing control with user memory, full audio routing control, and frame sync. Frame sync can be used to delay video or audio-video offset for lip-sync alignment. Factory presets enable a return to factory settings.

» FEATURES

HD/SD analog to SDI conversion	Timecode conversion from SD VITC waveform to SD ATC_VITC. +LTC option accommodates LTC timecode input from balanced analog audio, AES, or RS-485 deck/payout sources, with HD/SD insertion/conversion to VANC waveform or packet-based VITC/LTC SDI formats	24-bit audio embedding	AFD code insertion
Differential analog video inputs for power hum rejection	24-bit analog audio conversion	Audio channel mapping, downmixing, and level control	Dolby® Digital/E Decoder option with metadata output
5-Line adaptive comb filter for SD-Composite mode	Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding	Audio offset adjustment for lip-sync alignment	16 user presets
Video processing controls		Frame sync with up to 13 frames of user adjustable delay	Remote control/monitoring via DashBoard™ software or OGCP-9000 control panel
Analog and AES audio inputs and AES output		User offset to frame sync to align Dolby® delay HD/SD closed captioning support and flexible timecode processing	Five-year warranty



» ORDERING INFORMATION

9034 HD/SD 12-bit Analog to Digital Video Converter with Audio Embedding and Frame Sync

9034-SD SD Only 12-bit Analog to Digital Video Converter with Audio Embedding and Frame Sync

RM20-9034-A 20-Slot Frame Rear I/O Module (Standard Width) Analog Video Input, 4 AES In/Out BNCs, and 2 SDI Output BNCs

RM20-9034-B 20-Slot Frame Rear I/O Module (Standard Width) Analog Video Input, 4 Analog Audio Inputs, and 2 SDI Output BNCs

RM20-9034-C 20-Slot Frame Rear I/O Module (Double Width) Analog Video Input, 2 AES In BNCs, 4 AES In/Out BNCs, 8 Analog Audio Inputs, and 2 SDI Output BNCs

RM20-9034-D 20-Slot Frame Rear I/O Module (Double Width) Analog Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 6 AES Out BNCs, and 2 SDI Output BNCs

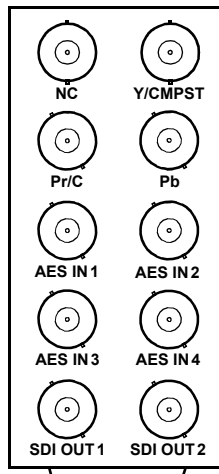
RM20-9034-E-DIN 20-Slot Frame Rear I/O Module (Standard Width, High-Density) Analog Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors DIN1.0/2.3)

RM20-9034-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, High-Density) Analog Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors HDBNC)

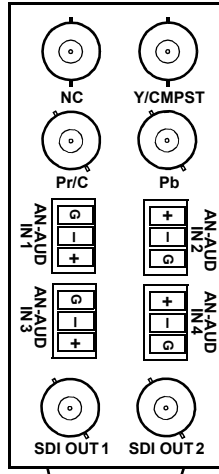
RM20-9034-F 20-Slot Frame Rear I/O Module (Double Width) Analog Video In, 4 AES In/Out BNCs, 8 Analog Audio In, RS-485 LTC / Metadata I/O Port, and 2 SDI Output BNCs



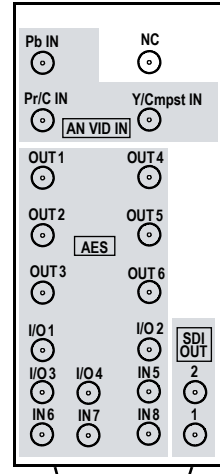
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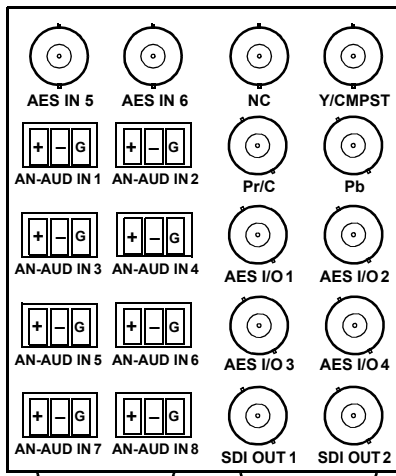
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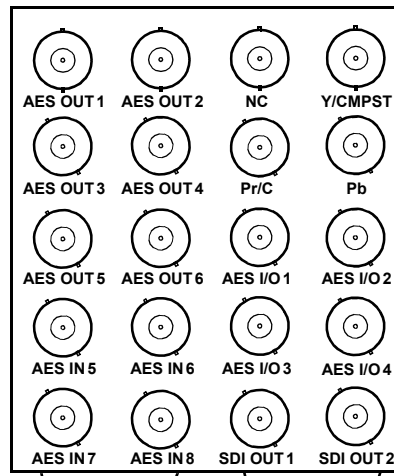
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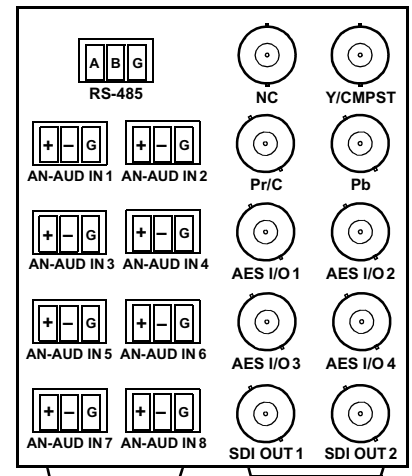
RM20-9034-E-DIN-HDBNC



RM20-9034-C



RM20-9034-D



RM20-9034-F

SPECIFICATIONS

Electrical

Power: 13 watts
Power (Dolby® +DEC option): 15.5 watts

Analog Video Input

HD Standard: YPbPr or RGB SMPTE
SD Standard: Composite, Y/C or Component (YPbPr BetaCam™, MII™ or SMPTE/N10)
Impedance: 75 Ω

AES Input

Number of Inputs: 16-Ch unbalanced BNC (nominal 48 kHz only)
Impedance: 75 Ω
Input Level: 0.1 V to 2.5 V p-p (5 V p-p tolerant)
Resolution: 24-bit

Analog Audio Input

Number of Inputs: 8-Ch balanced
Connector: Removable 3-pin Phoenix
Signal Level: up to +24 dBu
Sample Rate: 48 kHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
Standard: Tri-level sync (SMPTE 274) and Black Burst (NTSC and PAL)

Processing

A/D Conversion: HD: 4:4:4 SD: 8:8:8
Quantization: 12-bit A to D and 10-bit video data path
SD Comb Filter: 5-line adaptive

Processing Delay

Minimum Frame Sync Delay: < 3 lines

AES Output

Number of outputs: 16-Ch unbalanced BNC
Impedance: 75 Ω
Sample Rate: 48 kHz
Resolution: 24-bit

HD/SD-SDI Output

Number of outputs: 2
Standard: SMPTE 292 and 259M
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 270 MHz
>12 dB at 270 MHz - 1.485 GHz
Jitter: HD: < 0.15 UI
SD: < 0.10 UI
Embedded Audio: 16-Ch SD/HD

9035 » ANALOG AND SDI INPUT TO SDI OUTPUT CONVERTER

with Audio Embedding, Frame Sync

OPTIONS

Dolby® Digital/E Decoding (+DEC), Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC) 9035-SD Input Processor: SD Analog and SD-SDI Input with Audio Embedding/De-Embedding and Frame Sync

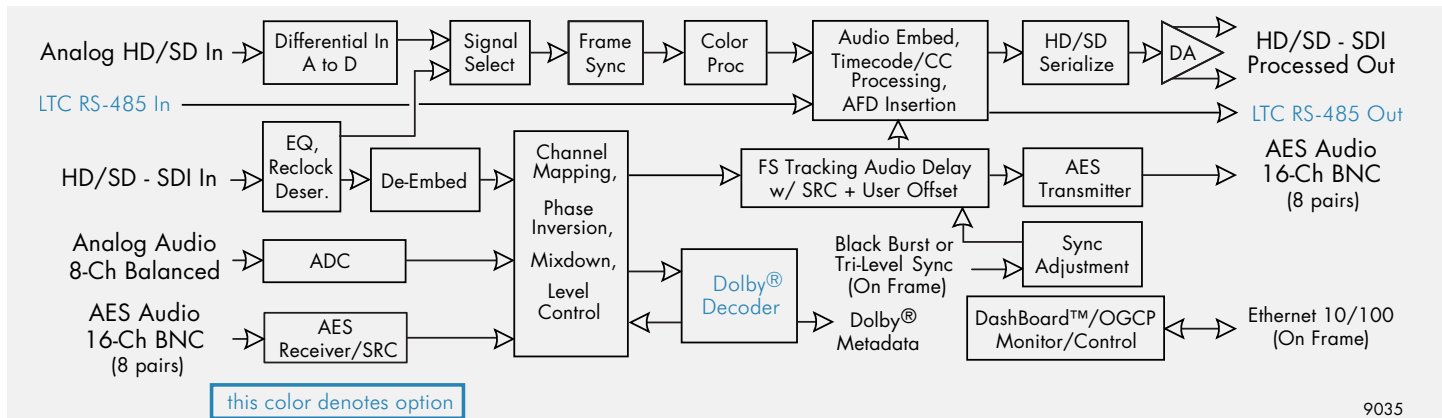


The 9035 provides analog-to-SDI conversion for HD and SD sources, with 12-bit conversion bit depth, and also accepts an HD/SD-SDI input with audio embed/de-embed and routing. Additionally, the 9035 provides frame sync and audio embedding with a crosspoint that accepts up to 16 channels of discrete AES audio, and up to eight channels of balanced analog audio.

The 9035 allows AFD code insertion, closed captioning and timecode insertion from SDI, VITC waveform (SD analog). The 9035 includes full video processing control with user memory, full audio routing control, and frame sync. Frame sync can be used to delay video or audio-video offset for lip-sync alignment. Factory presets enable a return to factory settings.

» FEATURES

HD/SD universal analog and digital inputs	24-bit audio embedding or de-embedding	Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding	HD/SD closed captioning support and flexible timecode processing
Differential analog video inputs for power hum rejection	Timecode insertion/conversion from SDI input and analog video input sources. +LTC option allows LTC input/output on shared port, with bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.	AFD code insertion	Dolby® Digital/E decoder option with metadata output
5-Line adaptive comb filter for SD-Composite mode	Audio channel mapping, downmixing, and level control	16 user presets	Remote control/monitoring via Dashboard™ software or OGCP-9000 control panel
Video processing controls	Frame sync with up to 13 frames of user adjustable delay	Audio offset adjustment for lip-sync alignment	Five-year warranty
Analog and AES audio inputs and AES output		User offset to frame sync to align Dolby® delay	
24-bit analog audio conversion			



9035

» ORDERING INFORMATION

9035 Input Processor: HD/SD Analog and HD/SD-SDI Input with Audio Embedding/De-Embedding and Frame Sync

9035-SD Input Processor: SD Analog and SD-SDI Input with Audio Embedding/De-Embedding and Frame Sync

RM20-9035-A 20-Slot Frame Rear I/O Module (Standard Width) Analog and Digital Video Input, 4 AES In/Out BNCs, and 2 SDI Output BNCs

RM20-9035-B 20-Slot Frame Rear I/O Module (Standard Width) Analog and Digital Video Input, 4 Analog Audio Inputs, and 2 SDI Output BNCs

RM20-9035-C 20-Slot Frame Rear I/O Module (Double Width) Analog and Digital Video Input, 2 AES In BNCs, 4 AES In/Out BNCs, 8 Analog Audio Inputs, 2 SDI Output BNCs

RM20-9035-D 20-Slot Frame Rear I/O Module (Double Width) Digital Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 8 AES Out BNCs, and 2 SDI Output BNCs

RM20-9035-E 20-Slot Frame Rear I/O Module (Double Width) Analog and Digital Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 6 AES Out BNCs, and 2 SDI Output BNCs

RM20-9035-F 20-Slot Frame Rear I/O Module (Double Width) Analog and Digital Video In, 4 AES In/Out BNCs, 8 Analog Audio In, RS-485 LTC / Metadata I/O Port, and 2 SDI Output BNCs

RM20-9035-G 20-Slot Frame Rear I/O Module (Triple Width) Analog and Digital Video In, 8 AES In BNCs, 8 AES Out BNCs, 8 Analog Audio In, and 2 SDI Output BNCs

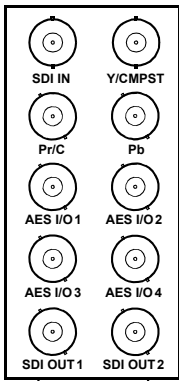
RM20-9035-H 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 AES BNC In/Out, 2 HD/SD-SDI Reclocked Outputs, 2 HD/SD-SDI Processed Outputs, RS-485 LTC/Metadata I/O Port

RM20-9035-E-DIN 20-Slot Frame Rear I/O Module (Standard Width, High-Density) Analog and Digital Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors DIN1.0/2/3)

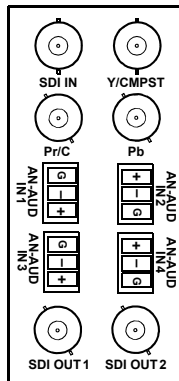
RM20-9035-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, High-Density) Analog and Digital Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors HDBNC)



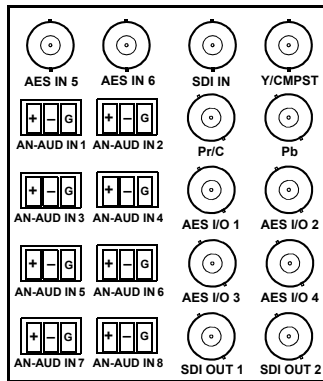
9035



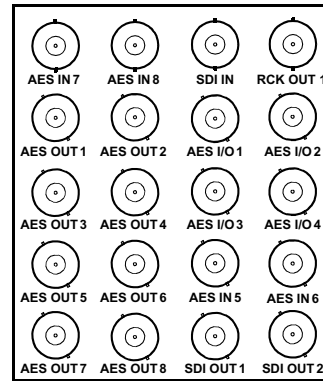
RM20-9035-A



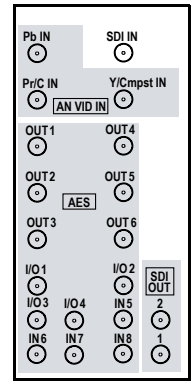
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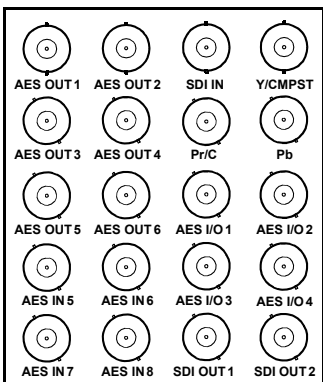
RM20-9035-C



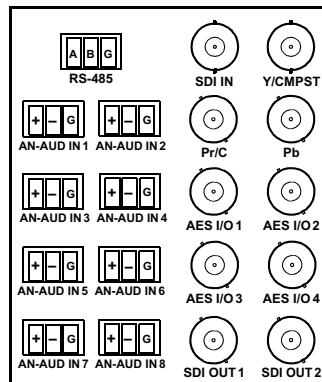
RM20-9035-D



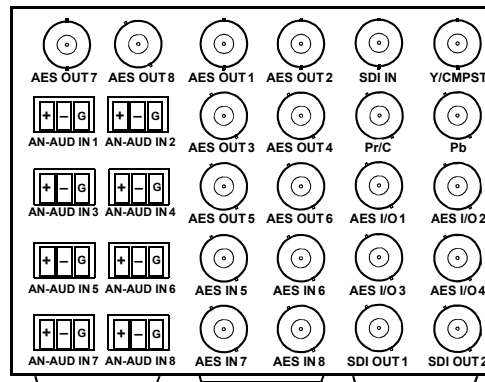
RM20-9035-E-DIN-HDBNC



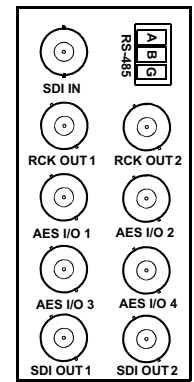
RM20-9035-E



RM20-9035-F



RM20-9035-G



RM20-9035-H

SPECIFICATIONS

Electrical

Power: 15 watts
Power (Dolby® +DEC option): 17.5 watts

HD/SD-SDI Input

Number of Inputs: 1
Standard: SMPTE 292 and 259M
Return Loss: >15 dB at 5 MHz - 1.485 GHz

Analog Video Input

HD Standard: YPbPr or RGB SMPTE
SD Standard: Composite, Y/C or Component (YPbPr BetaCam™, MII™ or SMPTE/N10)
Impedance: 75 Ω

AES Input

Number of Inputs: 16-Ch unbalanced BNC (nominal 48 kHz only)
Impedance: 75 Ω
Input Level: 0.1 V to 2.5 V p-p (5 V p-p tolerant)

Analog Audio Input

Number of Inputs: 8-Ch balanced
Connector: Removable 3-pin Phoenix
Signal Level: up to +24 dBu
Sample Rate: 48 kHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Processing

A/D Conversion: HD: 4:4:4 SD: 8:8:8
Quantization: 12-bit A to D and 10-bit video data path
SD Comb Filter: 5-line adaptive

Processing Delay

Minimum Frame Sync Delay: < 3 lines
Delay with FS disabled: < 3.5 μ

AES Output

Number of Outputs: 16-Ch unbalanced BNC
Impedance: 75 Ω
Sample Rate: 48 kHz
Resolution: 24-bit

HD/SD-SDI Output

Number of Outputs: 2
Standard: SMPTE 292 and 259M
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 270 MHz >12 dB at 270 MHz - 1.485 GHz
Jitter: HD: < 0.15 UI
SD: < 0.10 UI
Embedded Audio: 16-Ch SD/HD

9341 » 8-CHANNEL ANALOG AUDIO TO AES CONVERTER

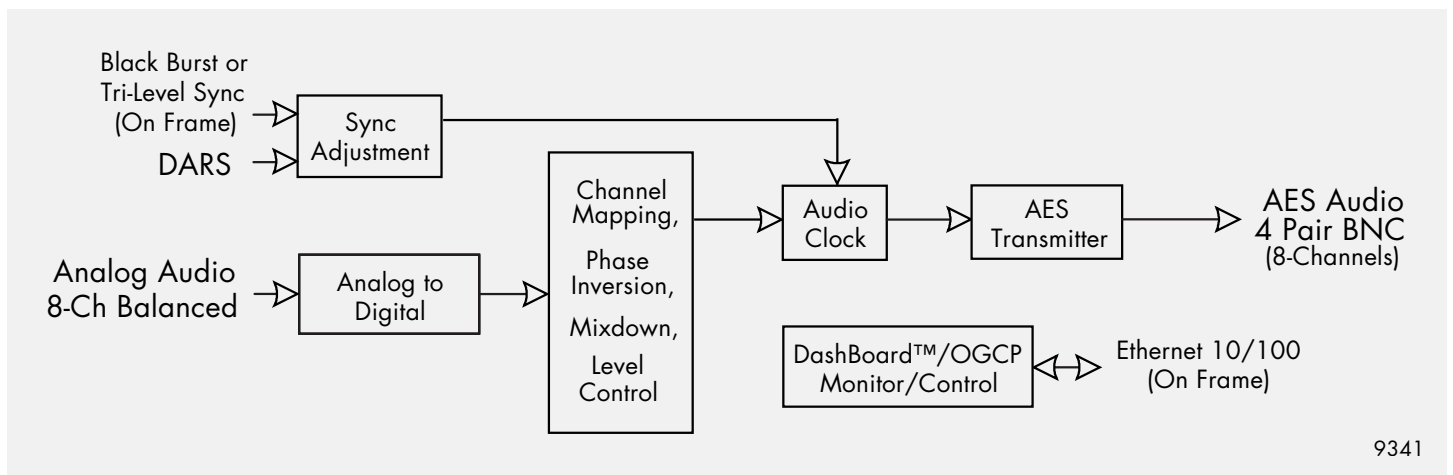


The 9341 is an analog audio to AES converter, supporting up to eight balanced analog inputs into 8 AES output channels. The 24-bit audio conversion supports audio input levels up to +24 dBu. The AES output pairs can be locally timed, or timed to a frame reference or a DARS input.

The 9341 features full user remote and card-edge control of audio level/polarity and channel routing - all with user memory. Factory presets enable a return to factory settings.

» FEATURES

Eight analog audio input channels	Remote and local audio level and mixing	Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel
Balanced inputs to +24 dBu	Remote/local control of mapping and inversion	Five-year warranty
24-bit audio conversion	Four internal tone generators	



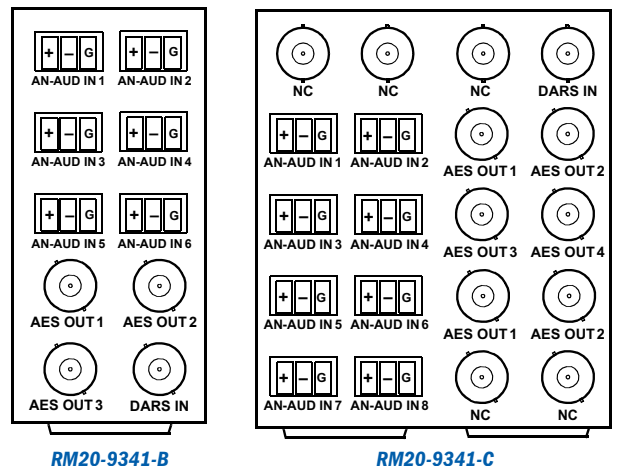
9341

» SPECIFICATIONS

Electrical		AES Output	
Power:	11 watts	Number of Outputs:	4 unbalanced BNCs (8 PCM channels)
Analog Audio Input		Impedance:	75 Ω
Number of Inputs:	8-Ch balanced	Sample Rate:	48 kHz
Connector:	Removable 3-pin Phoenix	Resolution:	24-bit
Signal Level:	up to +24 dBu		
Sample Rate:	48 kHz		

» ORDERING INFORMATION

- 9341** 8 Channel Analog to AES/EBU Digital Audio Converter
- RM20-9341-B** 20-Slot Frame Rear I/O Module (Standard Width) 6 Analog Audio Inputs, 3 AES Output BNCs, DARS Input BNC
- RM20-9341-C** 20-Slot Frame Rear I/O Module (Double Width) 8 Analog Audio Inputs, 6 AES Output BNCs, DARS Input BNC



9345 » STEREO ANALOG AUDIO TO AES A/D CONVERTER



The 9345 is an analog-to-AES digital audio converter, providing A/D audio conversion and AES signal distribution. The card supports audio sampling frequencies from 30 kHz to 192 kHz, and converts the incoming stereo analog audio signal to an AES digital audio signal using 24-bit conversion.

» FEATURES

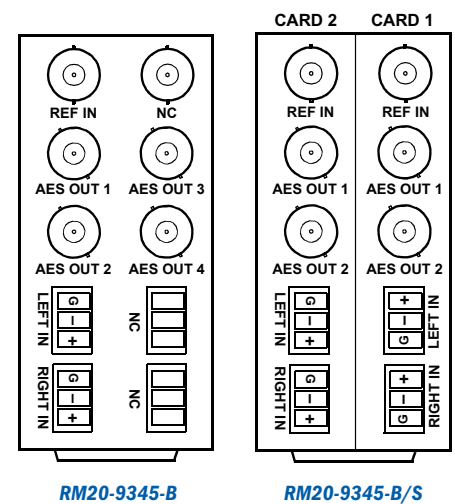
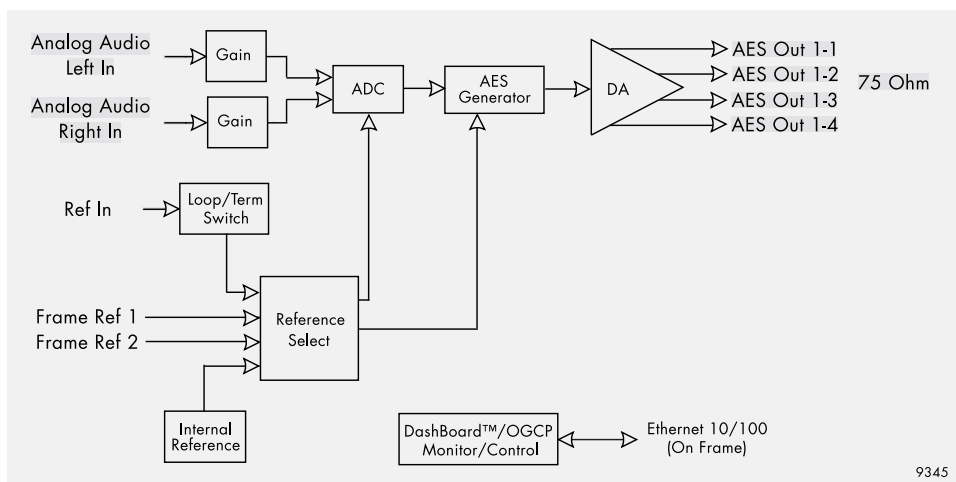
Internal clock generates audio sampling frequencies from 32 kHz to 192 kHz

Can synchronize to frame, external or internally generated reference signals

24-bit audio conversion

Remote control/monitoring via DashBoard™ software

Five-year warranty



» SPECIFICATIONS

Electrical

Power: 4 watts

Analog Audio Input

Number of Inputs: 2 balanced
 Impedance: >20 kΩ balanced
 Signal Level: up to +24 dBu
 Freq. Response: +/-0.2 dB at 20 Hz to 20 kHz
 THD+N: <0.01%
 Noise: -84 dBu at 20 Hz to 20 kHz

AES Output

Number of Outputs: 4 unbalanced
 Impedance: 75 Ω
 Resolution: 24-bit
 Level: 1 Vp-p
 Sample rate: 30 kHz to 192 kHz
 Jitter: <5 ns

» ORDERING INFORMATION

9345 Stereo Analog to AES/EBU Digital Audio Converter

RM20-9345-B 20-Slot Frame Rear I/O Module (Standard Width) 2 Balanced Analog Audio In, 4 AES Output BNCs, 1 Reference Input BNC

RM20-9345-B/S 20-Slot Frame Rear I/O Module (Split) 2 Balanced Analog Audio In, 2 AES Output BNCs, 1 Reference Input BNC (per card)



9262 » STEREO AES TO ANALOG AUDIO D/A CONVERTER



The 9262 features digital-to-analog audio conversion with AES/EBU signal distribution. It supports audio sampling frequencies from 30 kHz to 192 kHz, and converts the incoming AES digital audio signal to a stereo balanced analog audio signal pair using 24-bit conversion. Cable equalization and reclocking techniques enable the 9262 to reliably recover the incoming digital audio signal.

» FEATURES

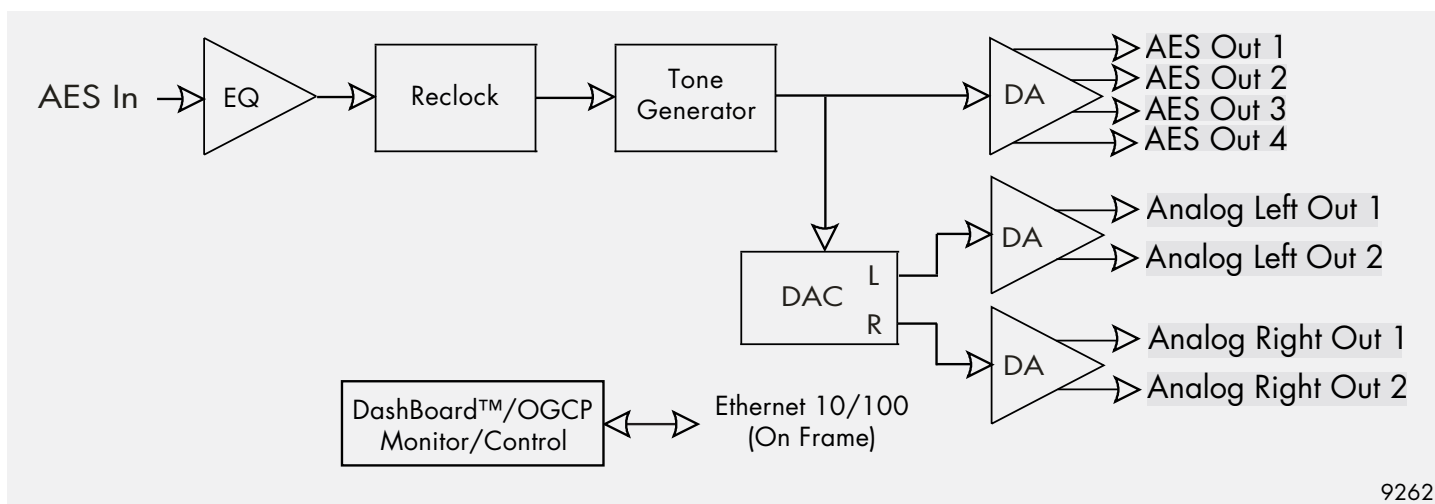
24-bit audio conversion

Supports audio sampling frequencies from 30 kHz to 192 kHz

Cable equalization and data reclocking on incoming AES/EBU signal

Remote control/monitoring via DashBoard™ software

Five-year warranty



9262

» SPECIFICATIONS

Electrical

Power: 4 watts

AES Input

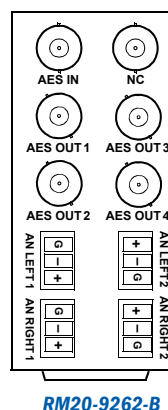
Number of inputs: 1 unbalanced (2 Ch)
 Impedance: 75 Ω
 Resolution: 24-bit
 Level: 0.2 - 7 Vp-p
 Sample rate: 30 kHz to 192 kHz

AES Output

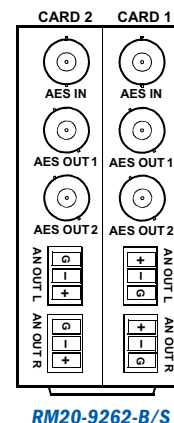
Number of outputs: 4 unbalanced
 Impedance: 75 Ω
 Resolution: 24-bit
 Level: 1 Vp-p
 Sample rate: 30 kHz to 192 kHz
 Jitter: <5 ns

Analog Audio Output

Number of Outputs: 4
 Impedance: 60 Ω balanced
 Freq. Response: +/-0.2 dB at 20 Hz to 20 kHz
 Max Level: +24 dBu
 THD+N: <0.01%
 Noise: -84 dBu at 20 Hz to 20 kHz



RM20-9262-B



RM20-9262-B/S



» ORDERING INFORMATION

9262 AES/EBU Digital to Stereo Analog Audio Converter

RM20-9262-B 20-Slot Frame Rear I/O Module (Standard Width) 1 AES Input BNC, 4 AES Reclocked Output BNCs, 4 Analog Audio Outputs

RM20-9262-B/S 20-Slot Frame Rear I/O Module (Split) Dual AES Input, 2 AES Outputs per card, 2 Analog Outputs (Stereo Pair) per card

9301 » AES AUDIO DELAY

OPTIONS

Audio Mixing (+AMx), Linear Acoustic® Upmixing (+UM), Linear Acoustic 5.1-Channel/Stereo Loudness Processing® (+LP51/LP20)

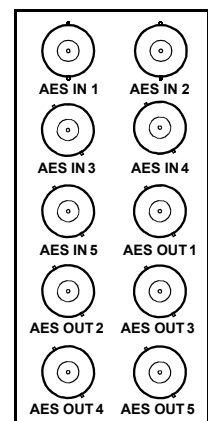
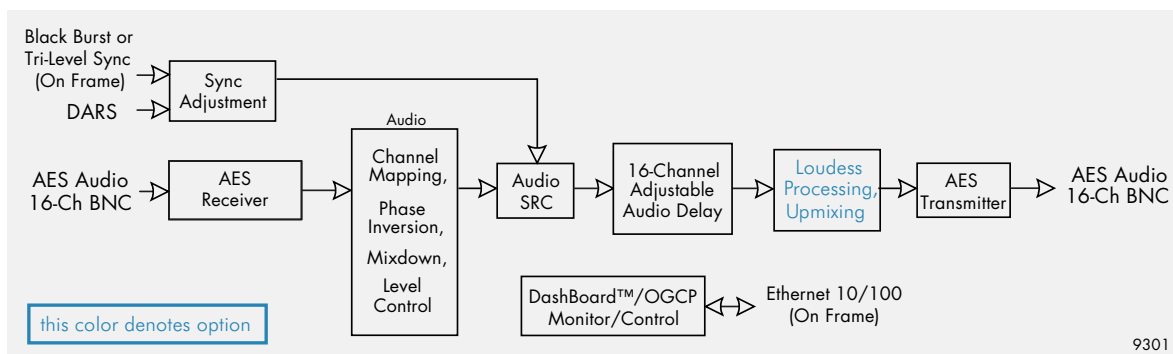


The 9301 is an AES audio delay unit with 16 channels of AES input and output. Optional AEROMAX® algorithms use a sophisticated multiband approach to loudness processing. These algorithms can apply multifaceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible. Because the card processes audio loudness locally and in sync with the video, loudness is processed without the accumulated latency delay found in other loudness processors.

The card offers full user remote and local control of audio levels, audio mapping and audio delay – all with user memory. Four built-in tone generators are also provided. Factory presets enable a return to factory settings.

» FEATURES

Audio channel mapping, and level control	Four internal tone generators	Remote control/monitoring via Dashboard™ or OGCP-9000 remote control panel
Independent delay for all 16 channels; pair delays can be locked	Adjustable delay up to 10.5 seconds	Five-year warranty
16 channels of AES input and output	Local or remote user controls	



RM20-9301-C

» SPECIFICATIONS

Electrical		AES Audio Delay	
Power:	5 watts	Maximum Per Ch:	10.5 seconds
		Delay Increment:	0.01 ms
AES Input		AES Output	
Number of Inputs:	16-Ch (8 pairs) unbalanced BNC	Number of Outputs:	16-Ch unbalanced BNC
Impedance:	75 Ω	Impedance:	75 Ω
Input Level:	0.1 V to 2.5 V p-p (5 V p-p tolerant)	Sample Rate:	48 kHz
Resolution:	24-bit	Resolution:	24-bit

» ORDERING INFORMATION

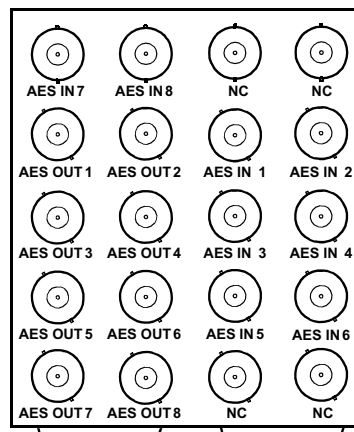
9301 AES Audio Delay with Audio Processing, Independent Delay per Channel

RM20-9301-C 20-Slot Frame Rear I/O Module (Double Width) 5 AES Input BNCs, 5 AES Output BNCs

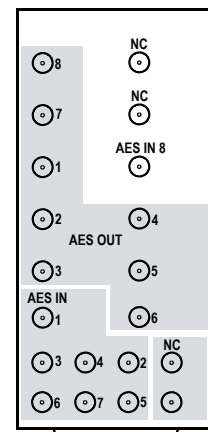
RM20-9301-D 20-Slot Frame Rear I/O Module (Triple Width) 8 AES Input BNCs, 8 AES Output BNCs

RM20-9301-D-DIN 20-Slot Frame Rear I/O Module (Standard Width, High-Density) 8 AES In, 8 AES Out (all connectors DIN1.0/2.3)

RM20-9301-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, High-Density) 8 AES In, 8 AES Out (all connectors HDBNC)



RM20-9301-D



RM20-9301-D-DIN-HDBNC



9305 » EMBEDDED AUDIO DELAY PROCESSOR

with Optional Audio Upmixing

OPTIONS

Linear Acoustic® Upmixing (+UM)

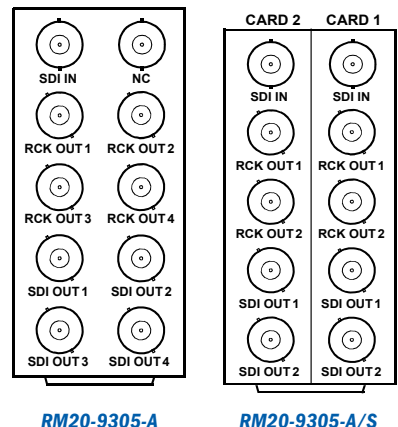
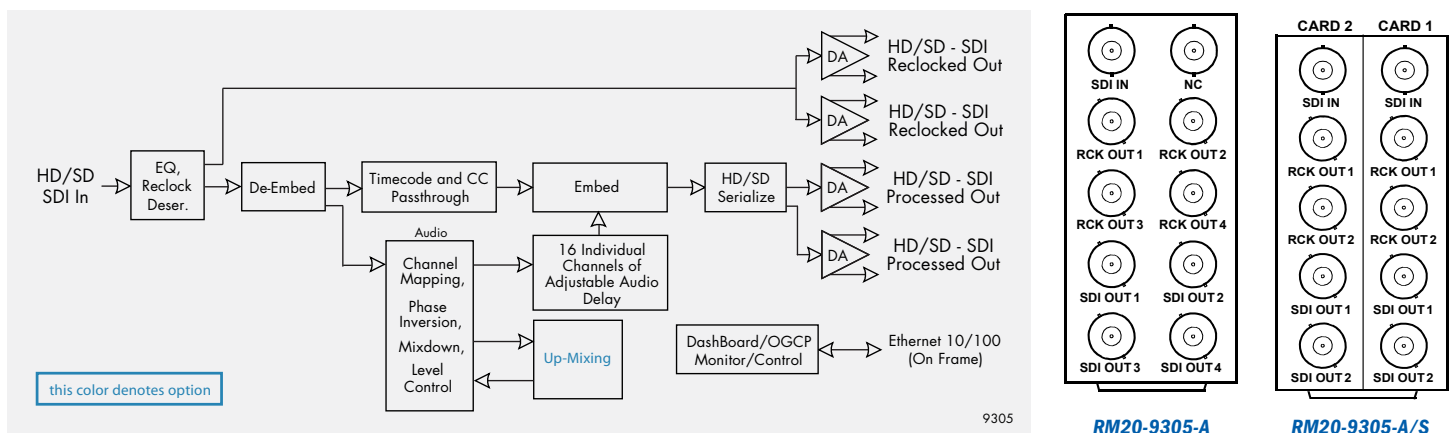


The 9305 is an embedded audio delay processor that receives an HD/SD-SDI signal, de-embeds all audio data, allows for independent delay for each channel, and re-embeds the audio into the SDI video stream. The active picture and all non-audio ancillary packets are left untouched. The card also features user control of gain and polarity for each channel.

An upmixer software option, featuring Linear Acoustic® technology, converts a stereo signal to a representative 5.1 surround signal. The upmix can be manually enabled, or operate in an automatic mode, where the upmixer monitors the input audio for stereo audio and replaces it with 5.1 surround. User controls are also provided for audio center width and surround field depth.

» FEATURES

Audio channel mapping and level control	Local or remote user controls	Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel
Independent delay for all 16 channels; pair delays can be locked	Optional audio upmixer featuring Linear Acoustic® technology (2.0 stereo ->5.1 surround)	Five-year warranty
Adjustable delay up to 10.5 seconds per channel		



» SPECIFICATIONS

Electrical Power: 7 watts	Embedded Audio Delay Maximum Per Ch: 10.5 seconds Delay Increment: 0.01 ms	HD/SD-SDI Output Number of Outputs: 4 processed, 4 reclocked Standard: SMPTE 292 and 259M Signal Level: 800 mV nominal Return Loss: >15 dB at 5 MHz - 270 MHz >12 dB at 270 MHz - 1.485 GHz Jitter: HD: < 0.15 UI SD: < 0.10 UI Embedded Audio: 16-Ch SD/HD
HD/SD-SDI Input Number of Inputs: 1 Standard: SMPTE 292 and 259M Return Loss: >15 dB at 5 MHz - 1.485 GHz	Upmixer Number of Input Channels: 2 or 6 Number of Output Channels: 6	

» ORDERING INFORMATION

9305 Embedded Audio Delay with Audio Processing, Independent Audio Delay per Channel	RM20-9305-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs	RM20-9305-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SDI Input, 2 HD/SD-SDI Reclocked Outputs per card, 2 HD/SD-SDI Processed Outputs per card
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9121 » 3G/HD/SD-SDI / ASI REDUNDANCY SWITCH



The 9121 3G/HD/SD-SDI / ASI Redundancy Switch allows manual or failover changeover control between two SDI or ASI sources to a common SDI or ASI output. Output routing uses a latching relay to retain the selected I/O path even if the card/frame is powered down or card is removed from its slot. Switchover can be manually activated or be set to provide intelligent automatic failover based on GPI or signal validity.

The 9121 is very straightforward in operation in that the signal path is via a direct relay path output (alternately, the selected input is available via non-relay coupled 4x cable drivers). The entire signal package is kept intact with no modification of the signal.

» FEATURES

Actively provides simplified protection switchover to alternate SDI/ASI stream in case of signal loss

Simple relay routing signal path maintains full signal integrity. Latching relay maintains signal path even if card/power is removed.

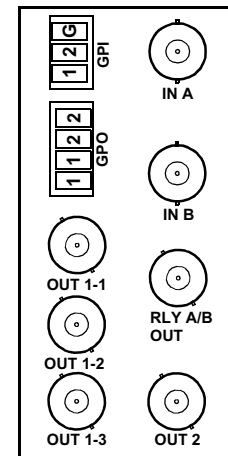
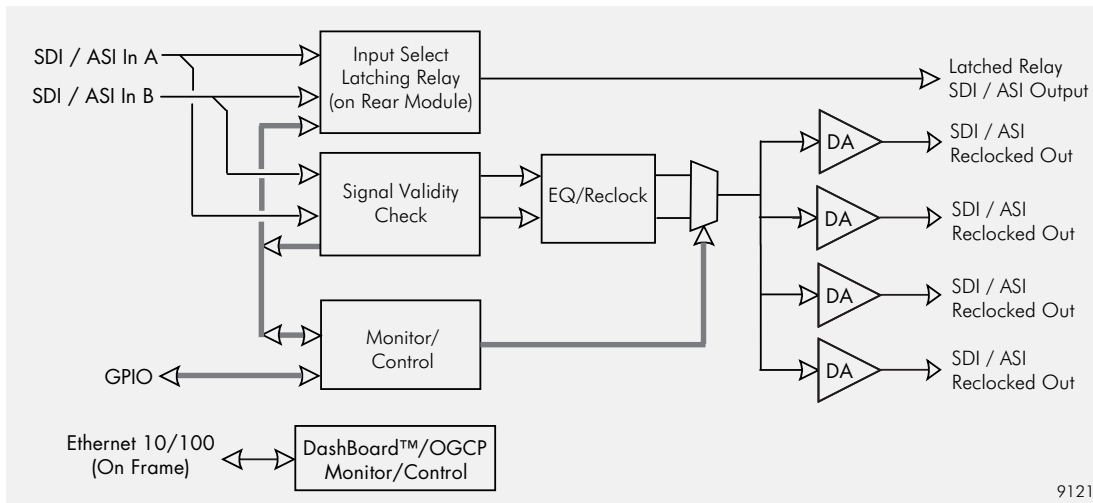
Alternate non-relay 4x DA output (with reclock enable/disable) also provided

Selectable input switchover with automatic failover on loss of input, or manual switchover using DashBoard remote control or GPI

3G/HD/SD-SDI and ASI compatible on all inputs and outputs

DashBoard™ signal status monitoring of both active and alternate inputs

Five-year warranty



RM20-9121-B

» SPECIFICATIONS

Electrical

Power: < 6 Watts

Switchover Triggering

Selectable automatic failover upon loss of valid SMPTE 425M, 292M, or 259M formatted signal. Manual switchover using DashBoard remote control or GPI.

3G/HD/SD-SDI / ASI Inputs

Number of inputs: 2
 Standards: 3G-SDI (SMPTE 424M)
 HD-SDI (SMPTE 292M)
 SD-SDI (SMPTE 259M)
 Impedance: 75Ω

SDI Outputs

Number of outputs: 1, 75Ω BNC Latching relay direct from selected input A or B
 4, 75Ω BNC Reclocked via mux from selected input A or B
 213Mbit/s maximum ASI TS bit-rate per port

GPI

Two independent inputs: Independent edge-triggered on H/L transition
 Connector: 3-terminal Phoenix; GPI-1/GPI-2/COM

GPO

Complement/Signaling: Two, independent. Non-referenced SPST relay closure upon configurable true condition(s). Connector: 4-terminal Phoenix; GPO 1-1/GPO 2-2

» ORDERING INFORMATION

9121 3G/HD/SD-SDI / ASI Redundancy Switch

RM20-9121-B 20-Slot Frame Rear I/O Module (Standard Width) Dual SDI/ASI Input, Relay SDI/ASI Output, 4 SDI/ASI Non-relay DA Outputs, 2 GPI, 2 GPO



9084 » HD/SD-SDI RGB COLOR CORRECTOR

with YCbCr Video Processing and Frame Sync



The 9084 offers RGB-space color correction with YCbCr processing features and frame sync for HD/SD-SDI video streams. The RGB processing controls provide full offset, gain and gamma adjustments. The YCbCr proc controls provide lift, gain, saturation, phase, white clip (hard and soft), black clip, and color saturation clip – all with user memory. Parameter updates are smooth and responsive, providing real-time adjustments. Even though the card provides extensive control of the signal from the RGB perspective, it will continue to pass those signals that fall outside of the RGB gamut. Plug and YCbCr limit ramp signals pass without modification. When the CbCr saturation clip is activated, the saturation limiting operation will not affect the color phase.

» FEATURES

Full RGB color corrector (offset, gain, gamma)

Passes all ancillary data, including embedded audio

Passes entire YCbCr gamut in unity gain configuration

10-bit gamma LUT

Extended YCbCr proc controls with white hard clip, white soft clip, black hard clip and saturation clip

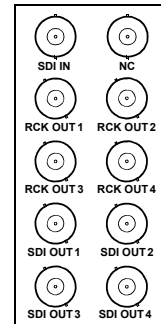
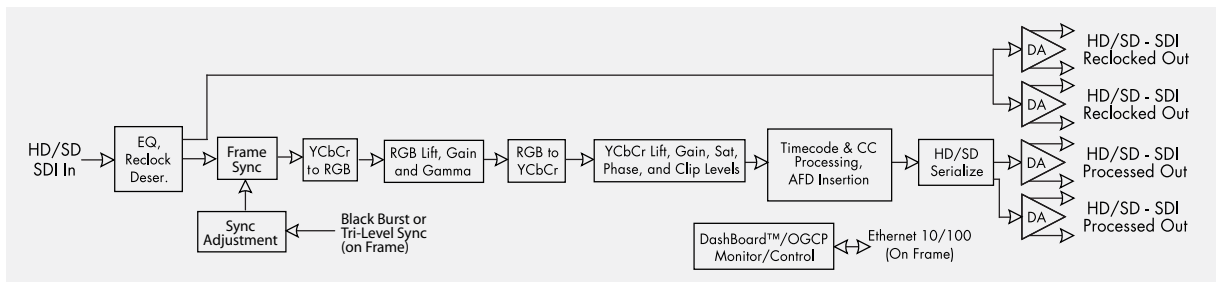
Phase preserved when applying saturation clip

One button bypass of color correction for comparison purposes

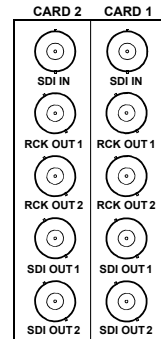
On-card storage of 16 presets

Remote control/monitoring via DashBoard™ software or OGCP-9000/CC remote control panel

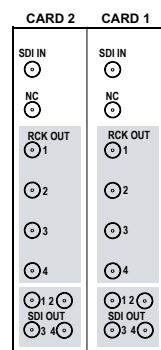
Five-year warranty



RM20-9084-A



RM20-9084-A/S



RM20-9084-B/S-DIN-HBNC



» SPECIFICATIONS

Electrical

Power: 8 watts

HD/SD-SDI Input

Number of Inputs: 1
Standard: SMPTE 292 and 259M
Return Loss: >15 dB at 5 MHz - 1.485 GHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Processing Delay

Minimum Frame Sync Delay: < 3 lines

AES Output

Number of outputs: 16-Ch unbalanced BNC
Impedance: 75 Ω
Sample Rate: 48 kHz

HD/SD-SDI Output

Number of Outputs: 4 reclocked, 4 processed
Standard: SMPTE 292 and 259M
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 270 MHz, >12 dB at 270 MHz - 1.485 GHz
Jitter: HD: < 0.15 UI, SD: < 0.10 UI
Embedded Audio: 16-Ch SD/HD

RGB Color Correction:

RGB Black Adjust (one per primary): -100% to 100% in 0.1% steps
RGB White Adjust (one per primary): 0% to 200% in 0.1% steps
RGB Gamma Control (one per primary): 0.125 to 8.0 in 0.001 steps

YCbCr Proc Amp:

White Adjust (Gain): 0 to 200% in 0.1% steps
Black Adjust (Lift): -100% to 100% in 0.1% steps
C Gain (Saturation): 0% to 200% in 0.1% steps
Color Phase: -360° to +360° in 0.1 degree steps

YCbCr Clipper:

Y Black hard clip (values limited at or above): -6.8% to 50% in 0.1% steps
Y White hard clip (values limited at or below): 50% to 109.1% in 0.1% steps
Y White soft clip (values rolled off at): 50% to 109.1% in 0.1% steps
CbCr Saturation clip (values limited at or below): 50% to 160% in 0.1% steps

Frame Sync Delay

Minimum: 3 lines
Maximum: 3 lines + 1 Frame
Delay with FS disabled: > 200 samples

» ORDERING INFORMATION

9084 HD/SD-SDI RGB Color Corrector with YCbCr Video Proc and Frame Sync

RM20-9084-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNCs, 4 HD/SD-SDI Reclocked Output BNCs, 4 HD/SD-SDI Output BNCs

RM20-9084-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input BNC, 2 HD/SD-SDI Reclocked Output BNCs per card, 2 HD/SD-SDI Output BNCs per card

OGCP-9000/CC 2RU Remote Control Panel for Color Correctors and Fusion3G®/COMPASS® Cards (Specify country of destination for power cord)

RM20-9084-B/S-HBNC 20-Slot Frame Rear I/O Module (Split, High Density) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Outputs (Per card; all connectors HD-BNC)

RM20-9084-B/S-DIN 20-Slot Frame Rear I/O Module (Split, High Density) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Outputs (Per card; all connectors DIN1.0/2.3)

9980-CSC-3G » 3G/HD/SD-SDI RGB COLOR SPACE CORRECTOR/FRAMESYNC

with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support



The all-new Cobalt® 9980-CSC-3G 3G/HD/SD-SDI RGB Color Space Corrector / Framesync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support provides a high-density card-based solution that includes an advanced framesync/pattern generator in addition to a full-featured SD/HD/3G color corrector. The 9980-CSC-3G offers RGB-space color correction with YCbCr proc features with RGB processing controls providing full offset, gain and gamma adjustments. The YCbCr proc controls provide lift, gain, saturation, phase, white clip (hard and soft), black clip, and color saturation clip.

The built-in pattern generator preceding the color correction block allows patterns (such as 75% or 100% bars) to be pre-emphasized or de-emphasized by the color corrector to match on-set camera colorimetry, with the custom settings saved to a preset, resulting in one-button recall of monitor/camera calibration settings. Any custom settings can be saved to user presets for instant recall via DashBoard or our intuitive OGCP-9000/CC Color Correction Remote Control Panel.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern while not changing any other processing settings or aspects. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Full RGB color corrector (offset, gain, gamma)

Framesync with full H/V offset and manual/LOS video pattern generator. Pattern generator in front of color corrector provides custom offset calibrations for on-set monitor/camera characteristics calibrated settings

Passes entire YCbCr gamut in unity gain configuration

10-bit gamma LUT

Extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip

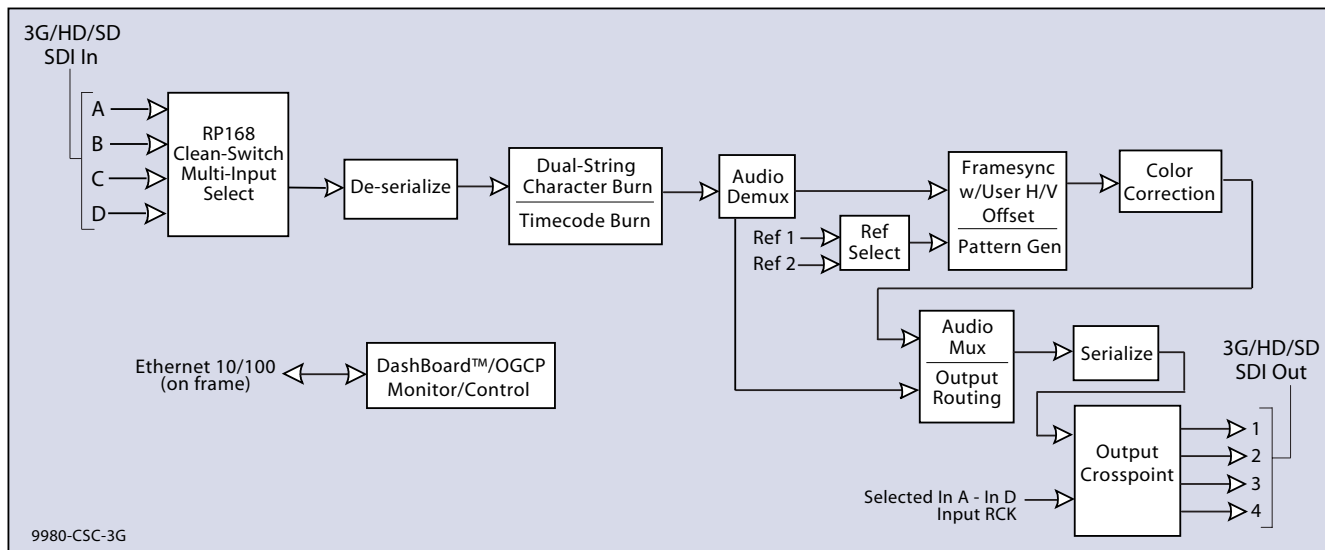
Phase preserved when applying saturation clip

One button bypass of color correction for comparison purposes

Low-power/high-density design - less than 18 Watts per card

Remote control/monitoring via DashBoard™ software or OGCP-9000/CC remote control panel. Award-winning OGCP-9000/CC Remote Control Panel provides fast and intuitive color correction control.

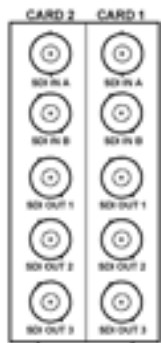
Five year warranty



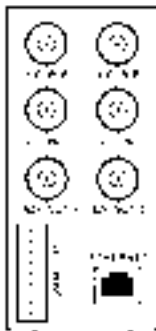
9980-CSC-3G



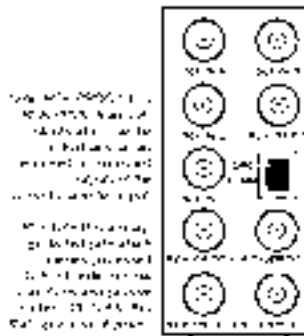
9980-CSC-3G



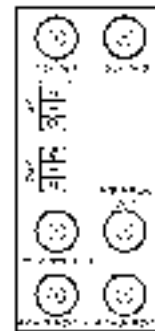
RM20-9980-A/S



RM20-9980-B



RM20-9980-C



RM20-9980-F

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
 Up to (4) 75Ω BNC outputs
 SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
 SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
 SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
 SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
 Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
 Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Framesync Audio/Video Delay

Max offset: 20 frames
 Latency (min): 1 frame

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level".
 Return Loss: >35 dB up to 5.75 MHz

RGB Color Correction

RGB Black Adjust (one per primary): -100% to 100% in 0.1% steps
 RGB White Adjust (one per primary): 0% to 200% in 0.1% steps
 RGB Gamma Control (one per primary): 0.125 to 8.0 in 0.001 steps

YCbCr Processing Amp

White Adjust (Gain): 0 to 200% in 0.1% steps
 Black Adjust (Lift): -100% to 100% in 0.1% steps
 C Gain (Saturation): 0% to 200% in 0.1% steps
 Color Phase: -360° to +360° in 0.1 degree steps

YCbCr Clip

Y Black hard clip (values limited at or above): -6.8% to 50% in 0.1% steps
 Y White hard clip (values limited at or below): 50% to 109.1% in 0.1% steps
 Y White soft clip (values rolled off at): 50% to 109.1% in 0.1% steps
 CbCr Saturation clip (values limited at or below): 50% to 160% in 0.1% steps

ORDERING INFORMATION

9980-CSC-3G 3G/HD/SD-SDI RGB Color Space Corrector / Framesync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

RM20-9980-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per Card 1 and Card 2 connector banks)

RM20-9980-B 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD/SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs, COMM/GPIO Port, Ethernet Port

RM20-9980-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), (1) GPIU/COMM RJ-45 connector

RM20-9980-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

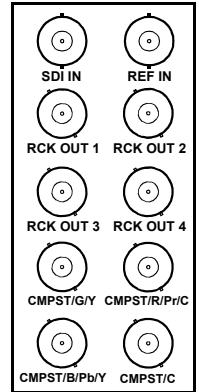
OGCP-9000/CC 2RU Remote Control Panel for Color Correction (Specify country of destination for power cord)

9011 » STANDARD DEFINITION D/A 10-BIT SDI TO ANALOG COMPOSITE, Y/C AND COMPONENT

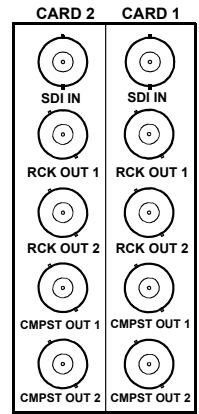


The 9011 provides 10-bit SD-SDI (SMPTE 259M-C)-to-analog video conversion with a variety of simultaneously available output formats: analog composite, Y/C, YPbPr, and RGB. When used with an “-A/S” (split) rear module, the space-saving design of the 9011 provides for high density, allowing two cards to be collocated in the same frame space normally occupied by a single card.

The 10-bit encoding engine oversamples 4:2:2 to 4:4:4 for internal processing, and then 4x oversamples the outputs to 16:16:16 for improved signal performance. An internal VCXO with de-jitter loop filter to 2 Hz reduces digital jitter prior to encoding, improving burst stability on composite and Y/C signals. A reference circuit color frames the 9011 for timed environments with full user processing control.



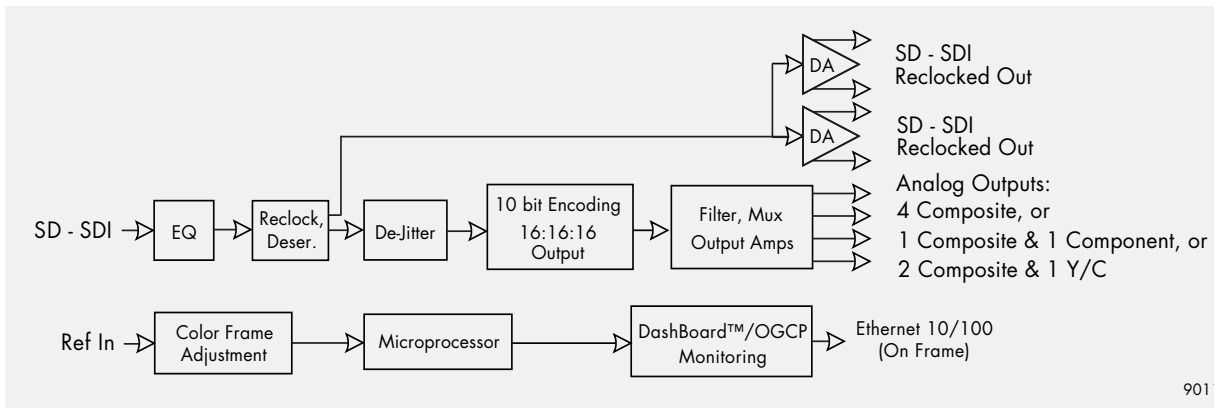
RM20-9011-A



RM20-9011-A/S

» FEATURES

10-bit digital to analog conversion	Encoding to 16:16:16 over sampled outputs	Internal color bar generator	Remote monitoring via Dash-Board™ software or OGCP-9000 remote control panels
Four user configurable analog outputs: composite, component, (YPbPr and RGB) and Y/C outputs	10-bit digital video path	User configuration switches on board edge	Five-year warranty
Supports component BetaCam™, MII™ and SMPTE/N10	Internal de-jitter filter to 2Hz	User processing control of video levels	
	Four reclocked SDI outputs		



9011

» SPECIFICATIONS

Electrical Power: 6 watts	SD Analog Outputs Number of Outputs: 4 composite or 2 composite with Y/C or 1 composite/component or RGB	Frequency Response 5 MHz +/- 0.15 dB, 0-6.75 MHz +/- 0.25 dB
SD-SDI Input Number of Inputs: 1 Standard: SMPTE 259M	Output Jitter Internal digital de-jitter filter to 2Hz	SNR > 70 dB
SD-SDI Outputs Number of Outputs: 4 Reclocked	D/A Process 4x or 2x over-sampled (16:16:16 or 8:8:8)	Proc Control Digital control of gain, DC, saturation and phase, filtering, gamma correction and DNR

» ORDERING INFORMATION

9011 Standard Definition D/A 10-bit SDI to Analog Composite, Y/C and Component	RM20-9011-A 20-Slot Frame Rear I/O Module (Standard Width) SDI Input, 4 Reclocked SDI Outputs, 4 Analog Outputs (Composite, Component, Y/C)	RM20-9011-A/S 20-Slot Frame Rear I/O Module (Split) Dual SDI Input, 2 Reclocked SDI Outputs per card, 2 Analog Outputs per card
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9015 » DUAL MONITORING CONVERTER SDI TO ANALOG COMPOSITE

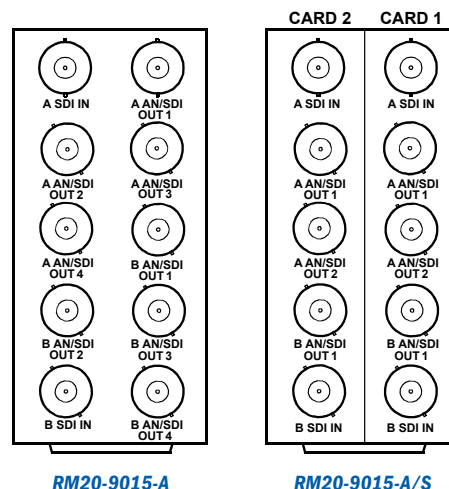
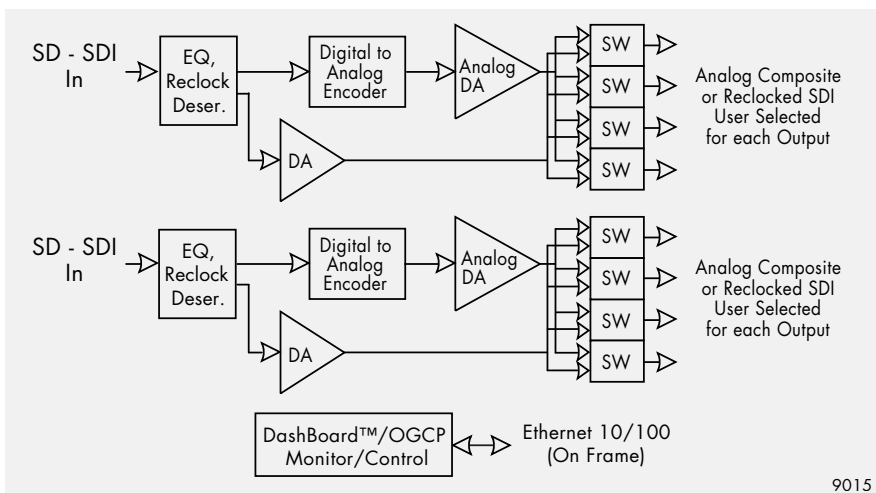
with Reclocked SDI



The 9015 is a dual SDI video-to-analog composite and relocked SDI converter. Analog or digital output configuration can be selected as needed for a particular application. The 9015 has two digital-to-analog encoders (A and B SDI to analog encoders). Each encoder has four outputs that can be user-configured as analog or relocked SDI on an output-by-output basis. Composite output gain control and user configurations are adjustable using the card-edge controls.

» FEATURES

Two conversions on one card (SDI-SMPTE 259M-C)	8-bit data path, 10-bit DAC Automatic configuration NTSC/PAL	Video gain control accessible on card edge	VBI blanking on/off
Four user selectable composite or SDI outputs per converter	Built-in color bar generator (analog outputs only)	Color encoding user selectable to B&W	Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panel
		Data-lock indicator	Five-year warranty



» SPECIFICATIONS

Electrical Power: 5 watts	Outputs Number of Outputs: 4 "A" channel outputs; configurable as analog composite or relocked SDI 4 "B" channel outputs; configurable as analog	Setup User selectable on/off for NTSC
SD-SDI Inputs Number of Inputs: 2 Standard: SMPTE 259M-C		Indicators 2 data lock indicators (one per converter)

» ORDERING INFORMATION

9015 Dual Monitoring Converter - SDI to Analog Composite with Reclocked SDI	RM20-9015-A 20-Slot Frame Rear I/O Module (Standard Width) Dual SDI In, 4 Outputs per Input (switchable between Composite or Reclocked SDI)	RM20-9015-A/S 20-Slot Frame Rear I/O Module (Split) Dual SDI In, 3 Outputs (switchable between Composite or Reclocked SDI) per card
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9016 » TRIPLE MONITORING CONVERTER SDI TO ANALOG COMPOSITE with Reclocked SDI



The 9016 is a triple SDI-to-analog composite encoder with relocked SDI. Analog or digital output configuration can be selected as needed for a given application. The 9016 has three separate SDI encoders, providing three outputs on converter A, two outputs on converter B, and two outputs on converter C. Each output can be selected to be either analog or digital. Analog output gain control for composite is adjustable using card-edge controls.

» FEATURES

Three conversions on one card (SDI SMPTE 259M-C)

User selectable analog composite or SDI outputs

8-bit data path, 10-bit DAC

Automatic configuration NTSC/PAL

Color encoding user selectable to B&W

Built-in color bar test generator (analog outputs only)

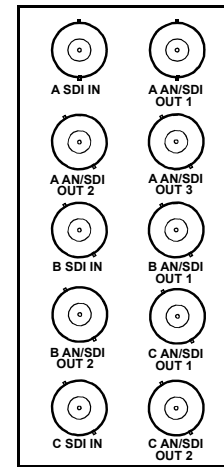
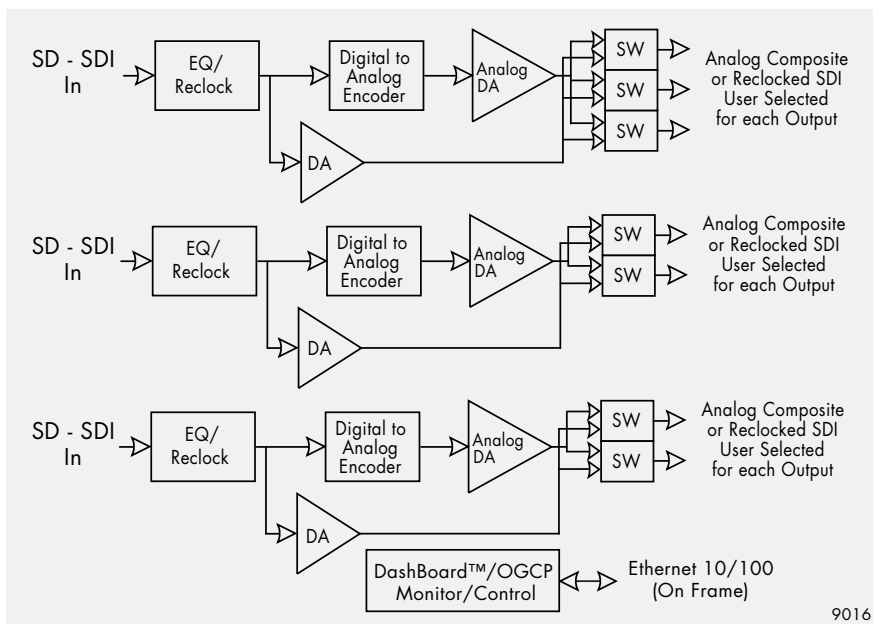
Video gain control accessible on card edge

Data-lock indicator

VBI blanking on/off

Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel

Five-year warranty



RM20-9016-A

» SPECIFICATIONS

Electrical

Power: 7 watts

SD-SDI Inputs

Number of Inputs: 3
Standard: SMPTE 259M-C

Outputs

Number of Outputs: 3x2x2 A, B, and C-Channel outputs; configurable as analog composite or relocked SDI

Indicators

3 data lock indicators (1 per converter)

» ORDERING INFORMATION

9016 Triple Monitoring Converter - SDI to Analog Composite with Reclocked SDI

RM20-9016-A 20-Slot Frame Rear I/O Module (Standard Width) -Ch A: 3 Out,-Ch B: 2 Out,-Ch C: 2 Out (Outputs switchable between Composite or Relocked SDI)



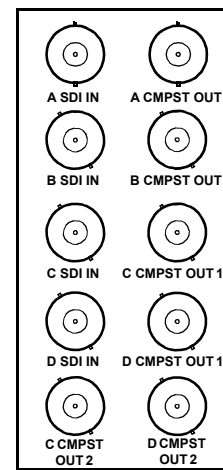
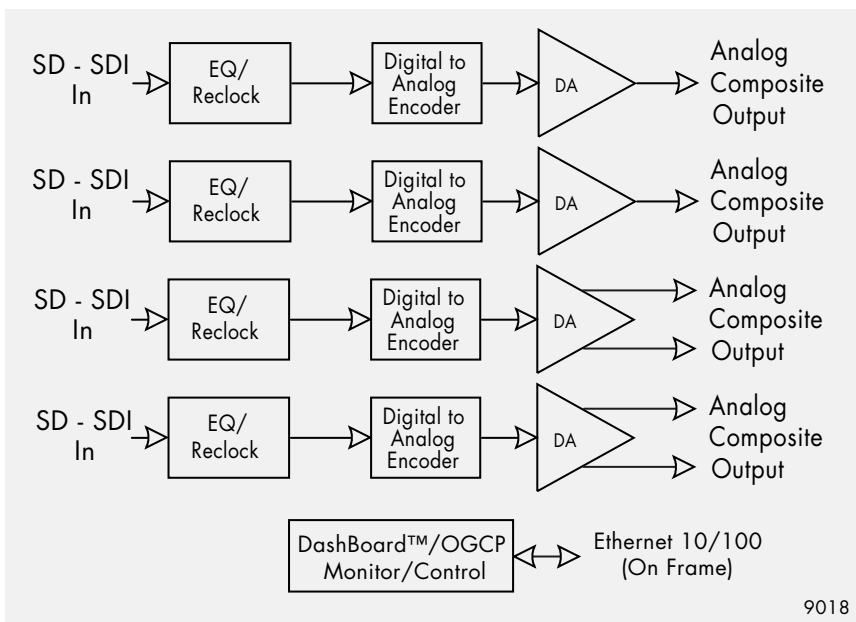
9018 » QUAD MONITORING CONVERTER SDI TO ANALOG COMPOSITE



The 9018 is a quad 4:2:2 SDI-to-analog composite converter. Card-edge gain, status LED, and configuration switches allow adjustments without having to remove the card from the frame. Configuration switches allow access to setup on/off (NTSC only), VBI blanking on/off and test color bars on/off. Other features include true sync output levels of -300 mV, low power consumption, and remote monitoring (including power and temperature) using DashBoard™ software.

» FEATURES

Four conversions on one card (SDI SMPTE 259M-C)	Automatic configuration NTSC/PAL	User setup switches in-frame accessible from card edge	Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel
8-bit input, 10-bit DAC	Color encoding user selectable to B&W	Data-lock indicator	Five-year warranty
Built-in color bar generator (Requires SDI clocking input)	User gain control in-frame accessible from card edge	VBI blanking on/off	



RM20-9018-A

» SPECIFICATIONS

Input 4-270 Mbit SMPTE 259M-C	Frequency Response 0-5 MHz +/- 0.25 dB	Chroma Luma Delay < 2 nS	Indicators Data lock - 1 per converter
Output 4- Analog composite video	SNR > 70 dB	Power 8 watts	

» ORDERING INFORMATION

9018 Quad Monitoring Converter- SDI to Analog Composite | **RM20-9018-A** 20-Slot Frame Rear I/O Module (Standard Width) -Ch A: 1 Output, -Ch B: 1 Output, -Ch C: 2 Outputs, -Ch D: 2 Outputs



9253 » 2X4 AES AUDIO DISTRIBUTION AMPLIFIER, 75 OHMS



The 9253 is a dual AES/EBU distribution amplifier, providing four copies of each incoming signal. The card supports audio sampling frequencies from 30 kHz to 192 kHz. It can also be used as a 1x8 distribution amplifier, providing eight outputs that are sample rate converted. Cable equalization and reclocking techniques enable the 9253 to reliably recover the incoming digital audio signal.

The 9253 has two 75 Ω unbalanced AES inputs and four 75 Ω unbalanced AES outputs per AES input. The card can be monitored for status using Dashboard™ remote control software.

» FEATURES

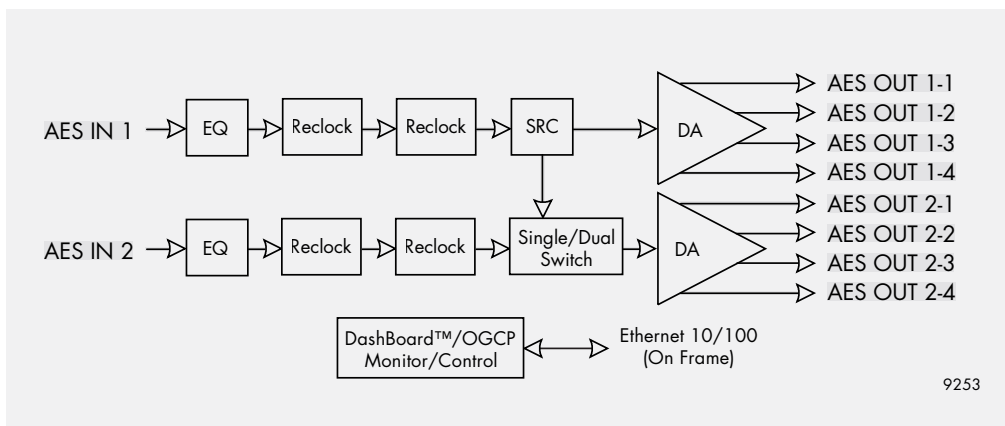
Supports audio sampling frequencies from 30 kHz to 192 kHz

Configurable as dual 1x4 or 1x8 distribution amplifier

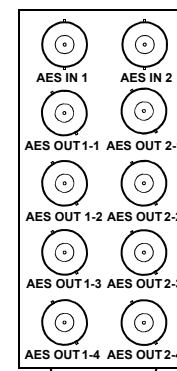
Five-year warranty

Cable equalization and data reclocking on AES inputs

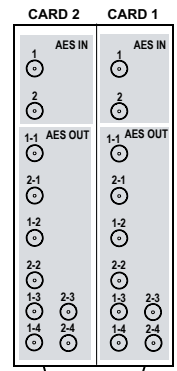
Remote monitoring via Dashboard™ software



9253



RM20-9253-A



RM20-9253-B/S

» SPECIFICATIONS

Electrical

Power: 4 watts

AES Input

Number of Inputs: 2 unbalanced BNC (2 Ch per BNC)
 Impedance: 75 Ω
 Resolution: 24-bit
 Level: 0.2 - 7 Vp-p
 Sample Rate: 30 kHz to 192 kHz

AES Output

Number of Outputs: 8 unbalanced BNC (2 Ch per BNC)
 Impedance: 75 Ω
 Resolution: 24-bit
 Level: 1 Vp-p
 Sample Rate: 30 kHz to 192 kHz
 Jitter: <5 ns

» ORDERING INFORMATION

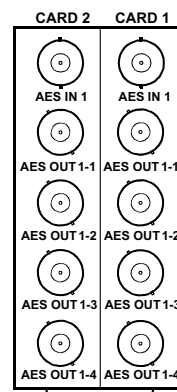
9253 2 X 4 AES/EBU Reclocking Distribution Amplifier, 75 Ohm, Unbalanced

RM20-9253-A 20-Slot Frame Rear I/O Module (Standard Width) 2 AES Inputs, 8 AES Outputs

RM20-9253-A/S 20-Slot Frame Rear I/O Module (Split) AES IN 1 Input BNC, 4 AES DA Output BNCs (AES OUT 1-1 thru AES OUT 1-4)

RM20-9253-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split, High Density) 2 AES Inputs, 8 AES Outputs(Per card; all connectors HD-BNC)

RM20-9253-B/S-DIN 20-Slot Frame Rear I/O Module (Split, High Density) 2 AES Inputs, 8 AES Outputs (Per card; all connectors DIN1.0/2.3)



RM20-9253-A/S

Note: Because input AES IN 2 cannot be used with this rear module, card should be set to 1x8 mode instead of 2x4 mode. Using 2x4 mode with this rear module will result in IN2 error indication.



9241 » ANALOG AUDIO DISTRIBUTION AMPLIFIER



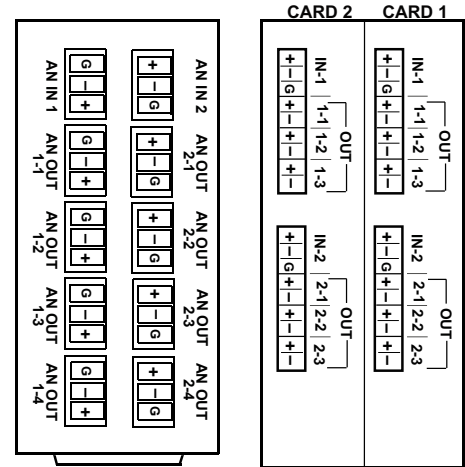
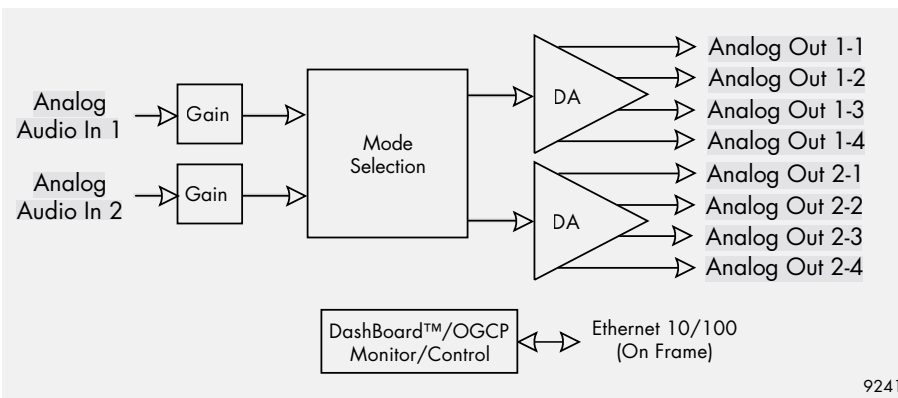
The 9241 is an analog audio distribution amplifier with up to eight low-impedance outputs designed for broadcast use. It can be used as either a mono or two-channel (stereo) audio DA. The 9241 can provide eight copies of a single (mono) input signal or four copies each of a two (stereo) inputs.

The 9241 can also sum two channels for creating a mono mix. It can also detect dead-air silence and set an alarm when no audio is present.

» FEATURES

- Handles mono or stereo signals
- Has summing capability
- Silence detection

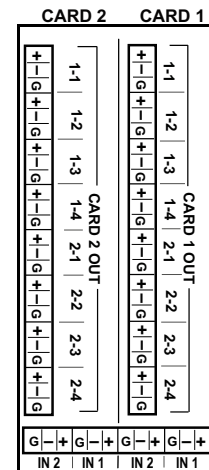
- Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel
- Five-year warranty



RM20-9241-B

Note: Outputs 2-1 thru 2-3 are outputs 1-4 thru 1-6 when card used in mono DA or mono mix DA mode.

RM20-9241-C/S



Note: Outputs 2-1 thru 2-4 are outputs 1-5 thru 1-8 when card used in mono DA or mono mix DA mode.

RM20-9241-D/S

» SPECIFICATIONS

Electrical

Power: 3 watts

Analog Audio Input

Number of inputs: 2 balanced
 Impedance: >20 kΩ balanced
 Max Level: +27.5 dBu
 Common Mode Rejection: >80 dB, 20 Hz to 20 kHz

Performance

Freq. Response: >0.1 dB at 20 Hz to 20 kHz
 Gain: -14 dB to +18 dB cont. variable
 Harmonic Dist: <0.01%
 SNR: > 95 dBu

Analog Audio Output

Number of Outputs: 8
 Impedance: 60 Ω balanced
 Max Level: +26 dBu



» ORDERING INFORMATION

9241 Analog Audio Distribution Amplifier, 1 X 8 Mono or 1 X 4 Stereo, with Summing Control

RM20-9241-B 20-Slot Frame Rear I/O Module (Standard Width) 2 Differential Analog Audio In, 8 Differential Analog Audio Outs

RM20-9241-C/S 20-Slot Frame Rear I/O Module (Split) Dual 1x3 Differential Analog Audio In/Out (per card)

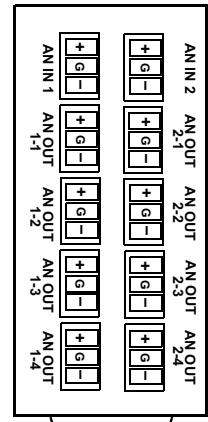
RM20-9241-D/S 20-Slot Frame Rear I/O Module (Split) Dual 1x4 Differential Analog Audio In/Out (per card)

9242 » ANALOG AUDIO DISTRIBUTION AMPLIFIER WITH REMOTE GAIN CONTROL



The 9242 Analog Audio Distribution Amplifier with Remote Gain Control is a broadcast-quality balanced analog audio DA with stereo 2x4, mono 1x8, and stereo sum L+R x 8 selectable output modes. Unlike most analog audio DAs, the 9242 electronic attenuators allow overall gain (stereo ganged) and per-channel trim (offset) via DashBoard™ remote control.

The space-saving design and very low power consumption of the 9242 provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard-width “split” rear module.



Note: + / G / - orientation on connectors varies from that on other Cobalt products. Make certain hookup is as shown here.

RM20-9242-B

» FEATURES

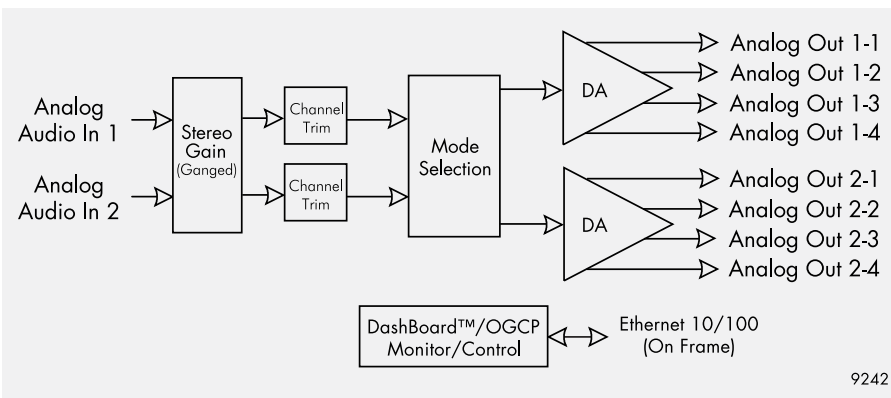
Full remote control of operating mode and gain control

Multiple modes – stereo 2x4, mono 1x8, and stereo sum L+R x 8 outputs

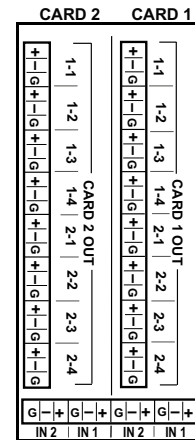
Full broadcast-grade balanced signal capability with 27.5 dBu maximum input level support. Low-impedance outputs.

Selectable card switch control or DashBoard™ remote control (usable with DashBoard™ and Cobalt OGCP-9000 remote control panels)

Five-year warranty

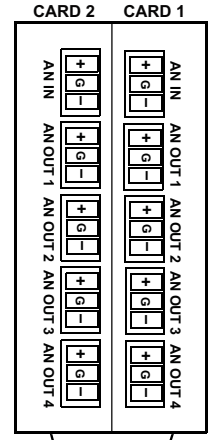


9242



Note: Outputs 2-1 thru 2-4 are outputs 1-5 thru 1-8 when card used in mono DA or mono mix DA mode.

RM20-9242-D/S



Note: + / G / - orientation on connectors varies from that on other Cobalt products. Make certain hookup is as shown here.

RM20-9242-C/S



» SPECIFICATIONS

Electrical

Power: < 5 Watts

Analog Audio Input

Number of Inputs: Two, balanced
 Impedance: > 20 kΩ, balanced
 Maximum Input Level: +27.5 dBu
 Connector Type: WECO® removable modular

Performance

Gain: -15 dB to +15 dB
 Frequency Response: 20 – 20 kHz ±0.1 dB
 Noise: < -85 dBu, 10 – 22 kHz at unity gain
 Harmonic Distortion: < 0.01%

Analog Audio Outputs

Number of Outputs: Eight, balanced; available as stereo 2x4, mono 1x8, and stereo sum L+R x 8 outputs
 Impedance: 60 Ω, balanced
 Output Isolation: > 60 dB
 Connector Type: WECO® removable modular

» ORDERING INFORMATION

9242 Analog Audio Distribution Amplifier with Remote Gain Control

RM20-9242-B 20-Slot Frame Rear I/O Module (Standard Width) 2 Balanced Analog Audio In, 8 Balanced Analog Audio Out

RM20-9242-C/S 20-Slot Frame Rear I/O Module (Split) 1x4 Balanced Analog Audio I/O (per card)

RM20-9242-D/S 20-Slot Frame Rear I/O Module (Split) Dual 1x4 Balanced Analog Audio I/O (per card)

9910DA-AV-EQ » ANALOG VIDEO DISTRIBUTION AMPLIFIER

With EQ

The all-new Cobalt® **9910DA-AV-EQ** Analog Video Distribution Amplifier with EQ provides 1x8 distribution with one analog input and eight 75Ω analog outputs. Card jumpers allow setting the input as differential (floating ground) or single-ended, AC or DC coupled, and Hi-Z looping input or on-card 75Ω terminated. Trim controls located on the front of the card allow EQ adjustment and gain control. The card can be accessed using DashBoard™ remote control for status monitoring.

» FEATURES

Multi-mode input provides differential or single-ended input and hi-Z looping or card-terminated operation

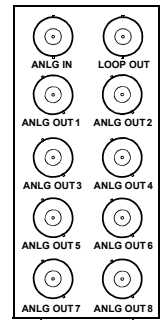
Signal path can be set as DC or AC coupled

User adjustable EQ and gain with easily accessible controls on front of card edge. EQ optimizes performance for input cable lengths exceeding 1000 ft (300m).

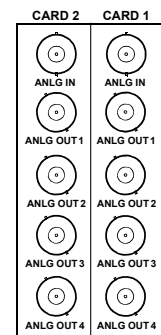
User-selectable input clamping (none, fast, or slow clamping selectable)

Remote monitoring via DashBoard™ software or OGCP-9000 Remote Control Panel

Five-year warranty

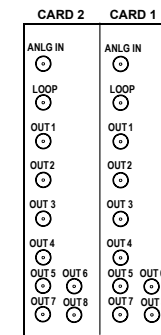


RM20-9910AV-B



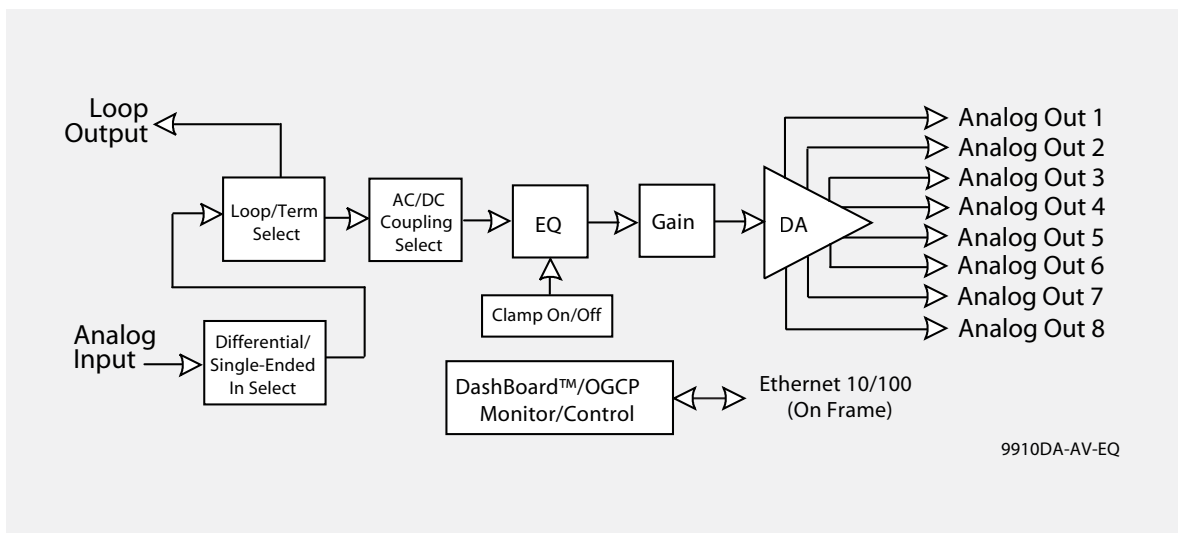
RM20-9910AV-A/S

Note: RM20-9910AV-A/S allows only typical single-ended input operation (shield conductor of input BNC tied to GND). Also, this rear module can only be used when input termination (non-looping) is selected using the card jumper.



RM20-9910AV-B/S

Note: RM20-9910AV-B/S allows only typical single-ended input operation (shield conductor of input BNC tied to GND).



9910DA-AV-EQ

» SPECIFICATIONS

Power
2 Watts

Analog Video Input
Number of inputs: (1)
Impedance: User selectable as hi-Z looping or card-terminated 75Ω
Level: 1 Vp-p, nominal
Return Loss: 46 dB @ 3.58 MHz
Input modes: User selectable as differential/single-ended and AC or DC coupled

Analog Video Outputs
Number of DA outputs: up to (8) Impedance: 75Ω
Level: 1 Vp-p, nominal Looping Output: (1)

Performance
Frequency response: >0.05 dB @ 3.58 MHz Differential Gain: >0.15% @ 3.58 MHz Differential Phase: >0.15° @ 3.58 MHz
S/N: >60 dB; 5 MHz BW

» ORDERING INFORMATION

9910DA-AV-EQ Analog Video Distribution Amplifier with EQ

RM20-9910AV-B 20-Slot Frame Rear I/O Module (Standard Width)
(1) Analog Video Input BNC, (8) Analog DA Output BNCs, (1) Input Loop Output BNC

RM20-9910AV-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards)
(1) Analog Video Input BNC, (4) Analog DA Output BNCs (connections are per card)

RM20-9910AV-B/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards)
(1) Analog Video Input, (8) Analog DA Outputs, (1) Input Loop Output (connections are per card; all connectors are DIN 1.0/2.3)

RM20-9910AV-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards)
(1) Analog Video Input, (8) Analog DA Outputs, (1) Input Loop Output (connections are per card; all connectors are HD-BNC)



9910DA-4Q-3G-EQ » 3G/HD/SD QUAD-CHANNEL MULTI-RATE DA

With x4 Output Crosspoint (Non-Reclocking)

The all-new Cobalt® 9910DA-4Q-3G-EQ 3G/HD/SD Quad-Channel Multi-Rate DA with x4 Output Crosspoint (Non-Reclocking) supports four input channels which can be crosspoint-routed to any of 16 DA outputs. The 9910DA-4Q-3G-EQ is multi-rate, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

The extremely flexible crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows quad 1x4, dual 1x8, single 1x16 and other routing possibilities (such as dual 1x4 plus a single 1x8). Any of the four input channels can be distributed or duplicated across four groups of 1x4 DAs. Any of the four inputs can be set to use an alternate failover input upon loss of signal.

Excellent receive performance allows receive EQ for up to 120m 3G and 160m HD cable length (1694A). Card edge and DashBoard™ remote status monitoring indicates input lock for each input channel. Up to 10 of the 9910DA-4Q-3G-EQ cards can be installed in a frame to provide 40 channels of input, with distribution to up to 160 outputs.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

» FEATURES

Full support of 3G/HD/SD-SDI and ASI/DVB

Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m SD)

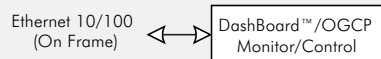
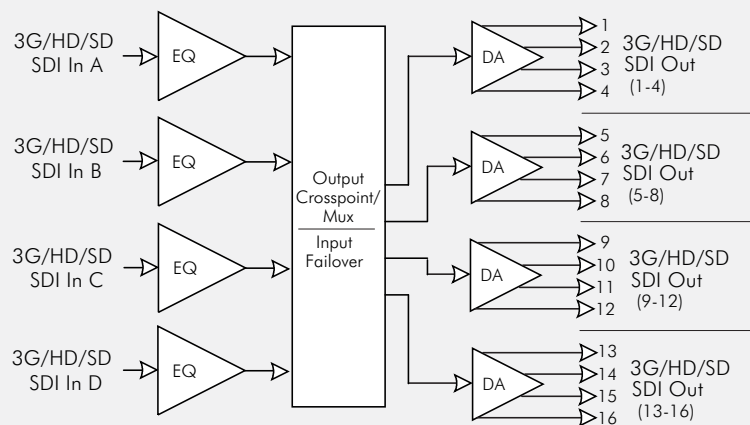
Flexible output crosspoint allows card to function as quad-channel 1:4, dual-channel 2:8, or single-channel 1:16 reclocking DA
Input data rate auto-detection for all industry-standard data rates

Failsafe mode automatically switches to selected secondary input on loss of primary input

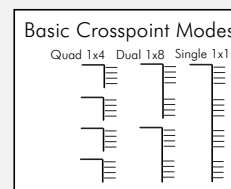
All outputs are non-inverting – ASI can be outputted on any output

Card edge and DashBoard™ status and individual input lock indicators

Five-year warranty



9910DA-4Q-3G-EQ





9910DA-4Q-3G-EQ

SPECIFICATIONS

<p>Power < 10 Watts</p>	<p>Receive Performance (Cable Length; Belden 1694A) 3 Gbps: 120m 1.485 Gbps: 160m 143-360 Mbps: 400m</p>	<p>3G/HD/SD-SDI / ASI Outputs (4x4) 75Ω BNC outputs (16 total). Each group of 4 outputs can be crosspoint connected to inputs A thru D. Signal Level: 800 mV nominal Return Loss: >15 dB at 5 MHz - 1.485 GHz Jitter (wideband): HD < 0.2 UI</p>
<p>3G/HD/SD-SDI / ASI Inputs 4) 75Ω BNC inputs (A thru D) SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz</p>		

ORDERING INFORMATION

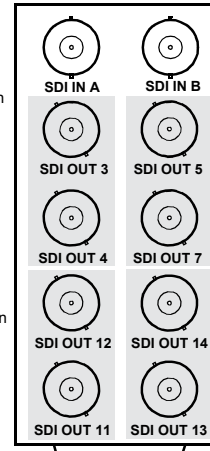
- 9910DA-4Q-3G-EQ** 3G/HD/SD Quad-Channel Multi-Rate DA with x4 Output Crosspoint (Non-Reclocking)
- RM20-9910-4Q-A** 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNC, (8) 3G/HD/SD-SDI Output BNCs
- RM20-9910-4Q-B-DIN** 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (16) 3G/HD/SD-SDI Outputs (DIN 1.0/2.3) (High Density)
- RM20-9910-4Q-B-DIN-HDBNC** 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (16) 3G/HD/SD-SDI Outputs (HDBNC) (High Density)
- RM20-9910-4Q-C** 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Input BNC, (7) 3G/HD/SD-SDI Output BNCs
- RM20-9910-4Q-D** 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (9) 3G/HD/SD-SDI Output BNCs
- RM20-9910-4Q-E** 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Input BNC, (16) 3G/HD/SD-SDI Output BNCs

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A and/or SDI IN B. Either of these inputs can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

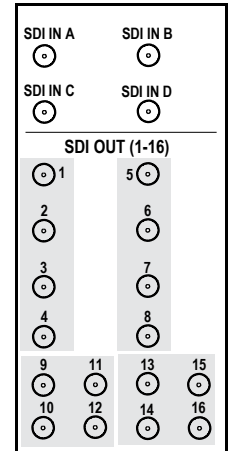
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

See Product Manual for more information.



RM20-9910-4Q-A



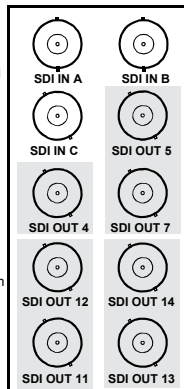
RM20-9910-4Q-B-DIN & RM20-9910-4Q-B-DIN-HDBNC

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A, SDI IN B and/or SDI IN C. Any of these inputs can be routed to any of the output quadrant groupings shown (groupings shown in shaded areas).

When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (5-8) (shown in the block diagram) consisting of SDI OUT 5 and SDI OUT 7 only.)

See Product Manual for more information.



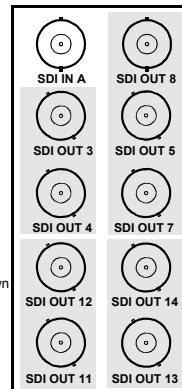
RM20-9910-4Q-C

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A. This input can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

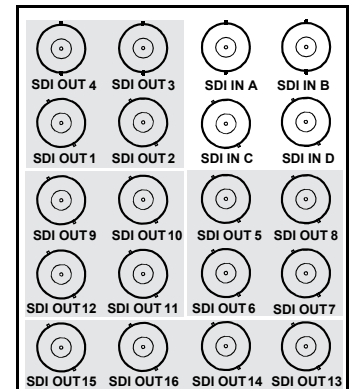
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum available 16 outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

See Product Manual for more information.



RM20-9910-4Q-D



RM20-9910-4Q-E



9910DA-4Q-3G-RCK » QUAD-CHANNEL MULTI-RATE RECLOCKING DA With x4 Output Crosspoint

The all-new Cobalt® 9910DA-4Q-3G-RCK 3G/HD/SD Quad-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint supports four input channels which can be crosspoint-routed to any of 16 DA outputs. The 9910DA-4Q-3G-RCK is multi-rate with user enable/disable reclocking, and supports SDI and ASI/DVB on all inputs and outputs with non-inverting outputs.

The extremely flexible crosspoint (which is user-configurable via DashBoard™ GUI remote control) allows quad 1x4, dual 1x8, single 1x16 and other routing possibilities (such as dual 1x4 plus a single 1x8). Any of the four input channels can be distributed or duplicated across four groups of 1x4 DAs. Any of the four inputs can be set to use an alternate failover input upon loss of signal.

Excellent receive performance allows receive EQ for up to 120m 3G and 160m HD cable length (1694A). Card edge and DashBoard™ remote status monitoring indicates input lock for each input channel. Up to 10 of the 9910DA-4Q-3G-RCK cards can be installed in a frame to provide 40 channels of input, with distribution to up to 160 outputs.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

» FEATURES

Full support of 3G/HD/SD-SDI and ASI/DVB

Reclocking can be enabled or disabled for each input channel

Excellent receive performance – EQ allows 1694A cable lengths up to 120m (3G) / 160m (HD) / 400m SD

Failsafe mode automatically switches to selected secondary input on loss of primary input

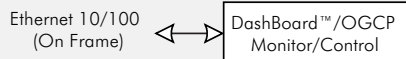
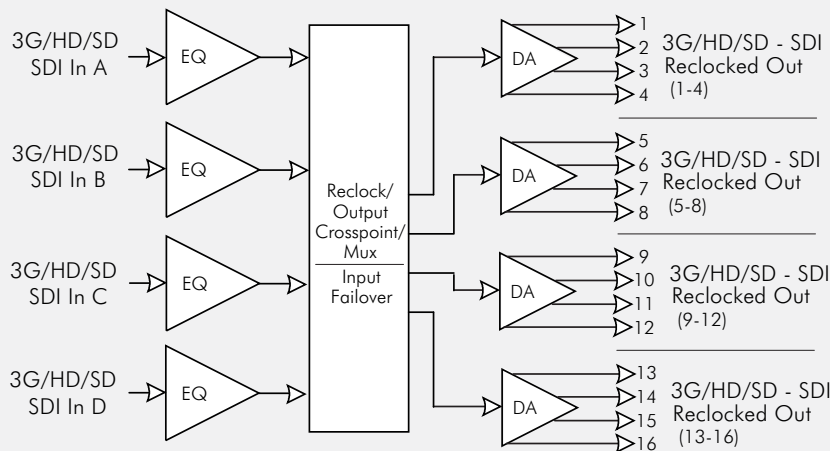
Flexible output crosspoint allows card to function as quad-channel 1:4, dual-channel 2:8, or single-channel 1:16 reclocking DA

Input data rate auto-detection for all industry-standard data rates

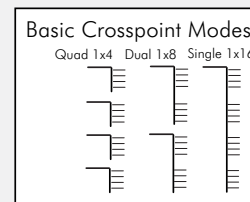
All outputs are non-inverting – ASI can be outputted on any output

Card edge and DashBoard™ status and individual input lock indicators

Five-year warranty



9910DA-4Q-3G-RCK





9910DA-4Q-3G-RCK

» SPECIFICATIONS

Power

< 10 Watts

3G/HD/SD-SDI / ASI Inputs

4) 75Ω BNC inputs (A thru D)
 SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
 SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Receive Performance (Cable Length; Belden 1694A)

3 Gbps: 120m
 1.485 Gbps: 160m
 143-360 Mbps: 400m

3G/HD/SD-SDI / ASI Outputs

(4x4) 75Ω BNC outputs (16 total). Each group of 4 outputs can be crosspoint connected to inputs A thru D.
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 1.485 GHz
 Jitter (wideband): HD < 0.2 UI

» ORDERING INFORMATION

9910DA-4Q-3G-RCK 3G/HD/SD Quad-Channel Multi-Rate Reclocking DA with x4 Output Crosspoint

RM20-9910-4Q-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNC, (8) 3G/HD/SD-SDI Output BNCs

RM20-9910-4Q-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (16) 3G/HD/SD-SDI Outputs (DIN 1.0/2.3) (High Density)

RM20-9910-4Q-B-DIN-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (16) 3G/HD/SD-SDI Outputs (HDBNC) (High Density)

RM20-9910-4Q-C 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Input BNC, (7) 3G/HD/SD-SDI Output BNCs

RM20-9910-4Q-D 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (9) 3G/HD/SD-SDI Output BNCs

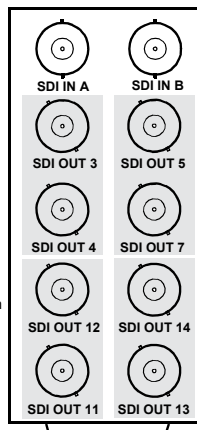
RM20-9910-4Q-E 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Input BNC, (16) 3G/HD/SD-SDI Output BNCs

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A and/or SDI IN B. Either of these inputs can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

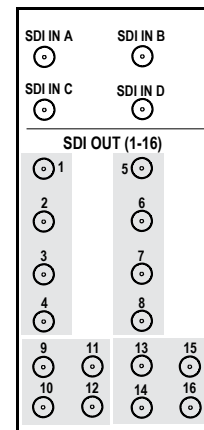
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

See Product Manual for more information.



RM20-9910-4Q-A



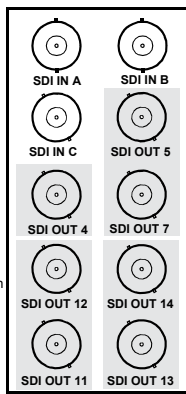
RM20-9910-4Q-B-DIN & RM20-9910-4Q-B-DIN-HDBNC

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A, SDI IN B and/or SDI IN C. Any of these inputs can be routed to any of the output quadrant groupings shown (groupings shown in shaded areas).

When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum 16 available outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (5-8) (shown in the block diagram) consisting of SDI OUT 5 and SDI OUT 7 only.)

See Product Manual for more information.



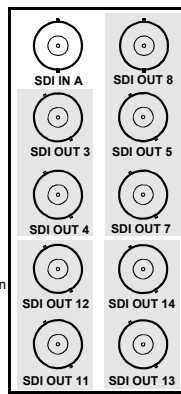
RM20-9910-4Q-C

Note: When this rear module is used DashBoard or local control should only be set to use SDI IN A. This input can be routed to any of the output quadrant groupings shown (grouping shown in shaded areas).

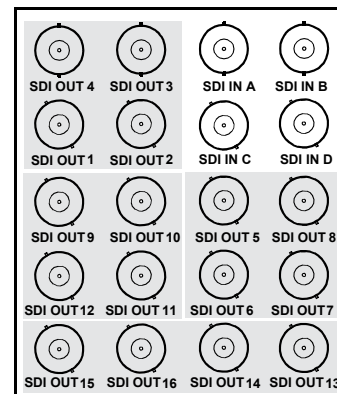
When local control instead of DashBoard is used, input routing to output groups on this rear module is fixed.

The outputs shown here are all that is available using this rear module, with these outputs being a reduced subset of the maximum available 16 outputs. (For example, this rear module offers a reduced subset of DA quadrant SDI Out (1-4) (shown in the block diagram) consisting of SDI OUT 3 and SDI OUT 4 only.)

See Product Manual for more information.



RM20-9910-4Q-D



RM20-9910-4Q-E

9001 » 3G/HD/SD 1X9 RECLOCKING DISTRIBUTION AMPLIFIER



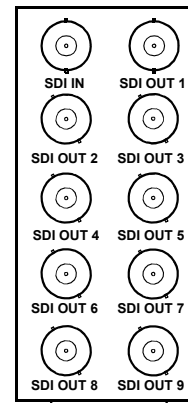
The 9001 is a multi-rate 1x9 SDI and ASI distribution amplifier capable of equalizing and reclocking 3G, HD, and SD signals. All outputs are non-inverting, allowing for reclocking of ASI signals. Excellent receiver EQ performance allows up to 150m cable lengths for HD signals.

» FEATURES

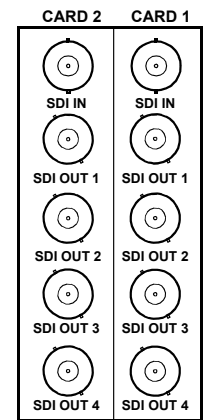
- Equalizes up to 150m of Belden 1694A cable at 1.485 Gbit
- Automatic rate detection for all popular data rates
- ASI reclocking on all outputs

Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel

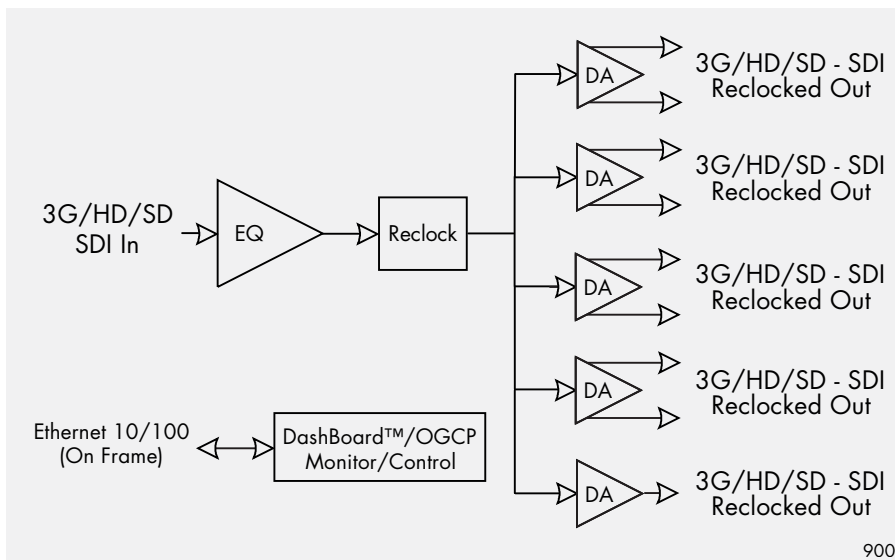
Five year warranty



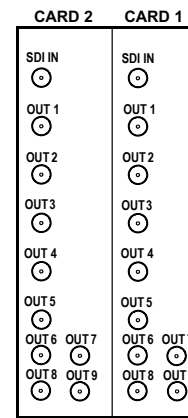
RM20-9001-A



RM20-9001-A/S



9001



RM20-9001-B/S



» SPECIFICATIONS

Electrical

Power: 2 watts

3G/HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 424M, 292M, and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz
 >10 dB at 1.5 GHz to 3 GHz

Cable Length Equalized (w/Belden 1694A)

3 Gbps: 80m
 1.485 Gbps: 150m
 143-360 Mbps: 350m

3G/HD/SD-SDI Output

Number of outputs: 9 (ASI compatible)
 Standard: SMPTE 424M, 292M, and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 1.485 GHz
 >10 dB at 1.5 GHz to 3 GHz
 Jitter (wideband): HD: < 0.2 UI

» ORDERING INFORMATION

9001 3G/HD/SD 1x9 Reclocking Distribution Amplifier

RM20-9001-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 9 Reclocked HD/SD-SDI Output BNCs

RM20-9001-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input BNC, 4 Reclocked HD/SD-SDI Output BNCs per card

RM20-9001-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input (HDBNC), 1x9 / 1x9 HD/SD-SDI Outputs per card (All connectors HDBNC)

RM20-9001-B/S-DIN 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input (DIN1.0/2.3), 1x9 / 1x9 HD/SD-SDI Outputs per card (All connectors DIN1.0/2.3)

9002 » 3G/HD/SD 1X9 DISTRIBUTION AMPLIFIER (NON-RECLOCKING)



The 9002 is a multi-rate 1x9 SDI and ASI distribution amplifier capable of equalizing 3G, HD, and SD signals. All outputs are non-inverting, allowing for distribution of ASI signals. Excellent receiver EQ performance allows up to 150m cable lengths for HD signals.

» FEATURES

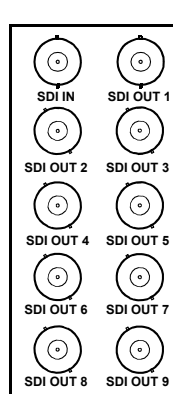
Automatic rate detection/display for all popular data rates

Remote monitoring via DashBoard™ software or OGCP-9000 remote control panel

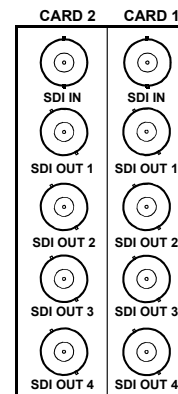
ASI distribution on all outputs

Equalizes up to 150m of Belden 1694A cable at 1.485 Gbit

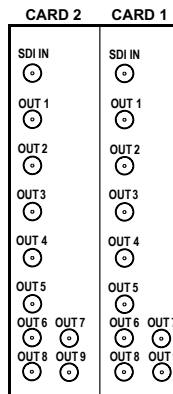
Five year warranty



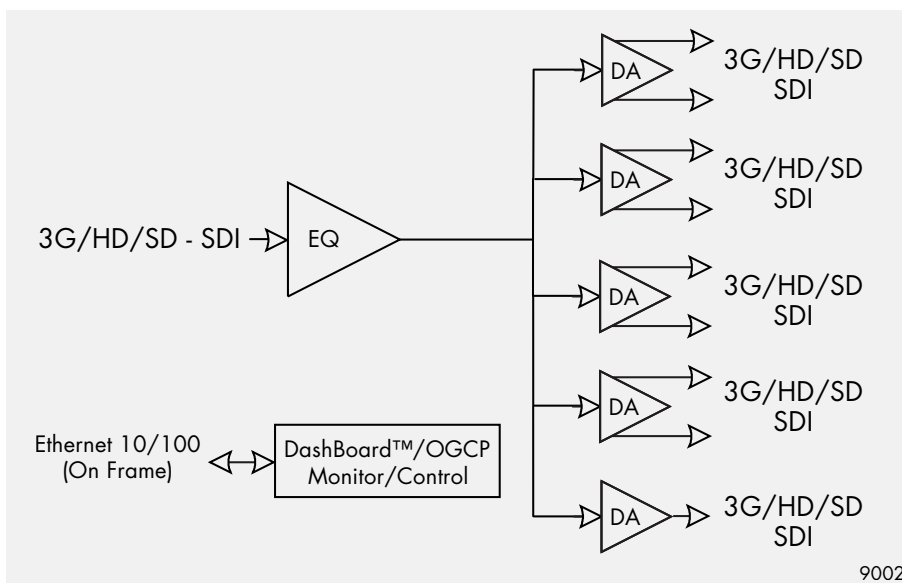
RM20-9002-A



RM20-9002-A/S



RM20-9002-B/S



9002



» SPECIFICATIONS

Electrical

Power: 2 watts

3G/HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 424M, 292M, and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz
 >10 dB at 1.5 GHz to 3 GHz

Cable Length Equalized (w/Belden 1694A)

3 Gbps: 80m
 1.485 Gbps: 150m
 143-360 Mbps: 350m

3G/HD/SD-SDI Output

Number of outputs: 9 (ASI Compatible)
 Standard: SMPTE 424M, 292M, and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 1.485 GHz
 >10 dB at 1.5 GHz to 3 GHz
 Jitter (wideband): HD: < 0.2 UI

» ORDERING INFORMATION

9002 3G/HD/SD 1x9 Non-Reclocking Distribution Amplifier

RM20-9002-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 9 HD/SD-SDI Output BNCs

RM20-9002-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input BNC, 4 HD/SD-SDI Output BNCs per card

RM20-9002-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input (HDBNC), 1x9 HD/SD-SDI Outputs per card (All connectors HDBNC)

RM20-9002-B/S-DIN 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input (DIN1.0/2.3), 1x9 HD/SD-SDI Outputs per card (All connectors DIN1.0/2.3)

9003 » DUAL-CHANNEL 3G/HD/SD RECLOCKING DISTRIBUTION AMPLIFIER

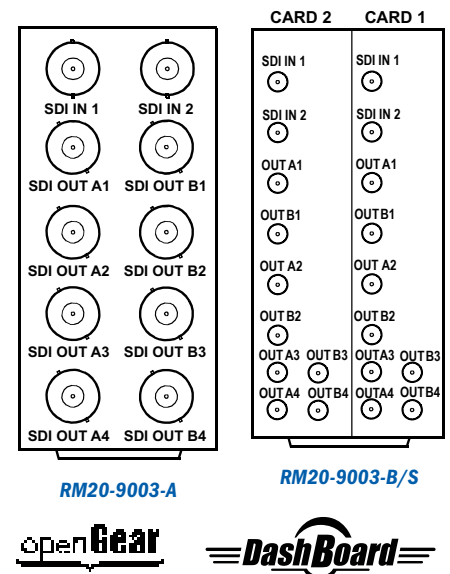
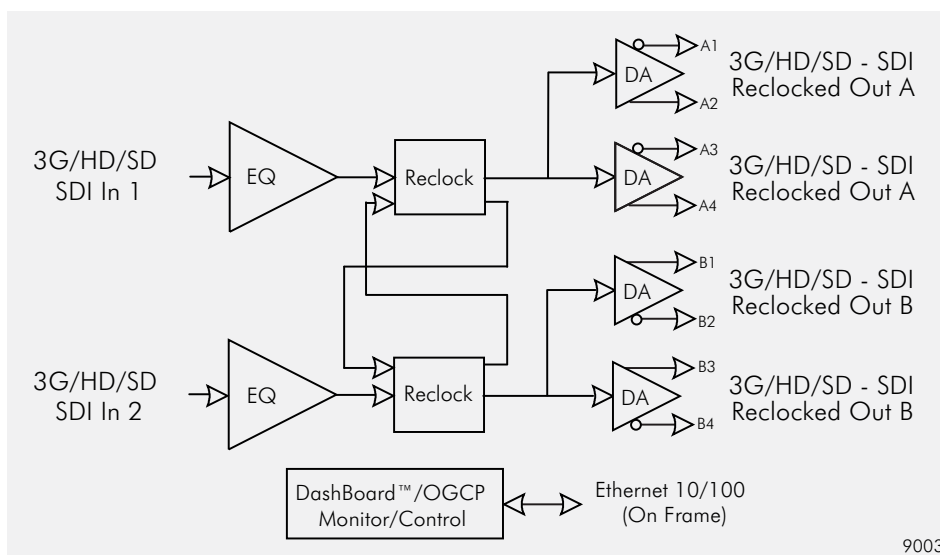


The 9003 is a two-channel, multi-rate SDI distribution amplifier capable of equalizing and reclocking 3G, HD, and SD signals. Excellent receiver EQ performance allows for up to 160m cable lengths for HD signals.

The 9003 can be set up as either a single-channel 1:8, dual-channel 1:4, or 1:8 with failsafe using DashBoard™ remote control software or card-edge switches. In failsafe mode, the card automatically switches to the secondary input if the primary input is lost.

» FEATURES

Dual or single input with user-configurable modes	Remote monitoring via DashBoard™ software or OGCP-9000 remote control panel
Automatic rate detection/display for all popular data rates	Failsafe mode automatically switches to secondary input on primary input loss
Equalizes up to 160m of Belden 1694A cable at 1.485 Gbit	Five year warranty



» SPECIFICATIONS

Electrical Power: 3 watts	Cable Length Equalized (w/Belden 1694A) 3 Gbps: 100m 1.485 Gbps: 160m 143-360 Mbps: 350m	3G/HD/SD-SDI Output Number of outputs: 8 (4 ASI Compatible) Standard: SMPTE 424M, 292M, and 259M Signal Level: 800 mV nominal Return Loss: >15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz Jitter (wideband): HD: < 0.2 UI
3G/HD/SD-SDI Input Number of Inputs: 2 Standard: SMPTE 424M, 292M, and 259M Return Loss: >15 dB at 5 MHz - 1.485 GHz >10 dB at 1.5 GHz to 3 GHz		

» ORDERING INFORMATION

9003 Dual-Channel 3G/HD/SD Reclocking Distribution Amplifier, 2 X 4 or 1 X 8 Configurations, Failover Mode	RM20-9003-B/S-HDBNC 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Dual 3HD/SD-SDI Inputs, 8 Reclocked 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes) (HDBNC High Density)	RM200-9003-B/S DIN RM20-9003-B/S-DIN 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Dual 3HD/SD-SDI Inputs, 8 Reclocked 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes) (DIN 1.0/2.3 High Density)
RM20-9003-A 20 Slot Frame Rear I/O Module (Standard Width) Dual 3G/HD/SD-SDI Inputs, 8 Reclocked 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes)		

9004 » DUAL-CHANNEL 3G/HD/SD DISTRIBUTION AMPLIFIER (NON-RECLOCKING)



The 9004 is a dual multi-rate SDI distribution amplifier capable of equalizing 3G, HD, and SD signals. Excellent receiver EQ performance allows for up to 160m cable lengths for HD signals.

The 9004 can be set up as either a single-channel 1:8, dual-channel 1:4, or 1:8 with failsafe using DashBoard™ remote control software or card-edge switches. In failsafe mode, the card automatically switches to the secondary input if the primary input is lost.

» FEATURES

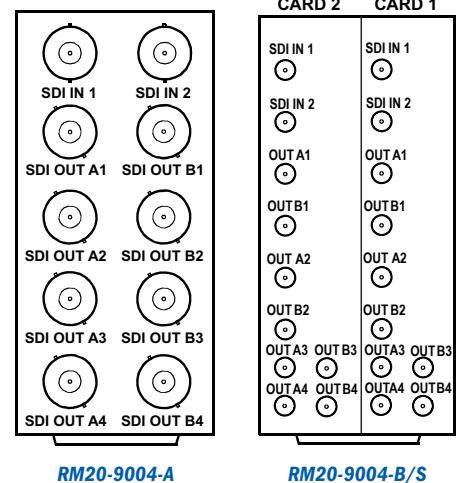
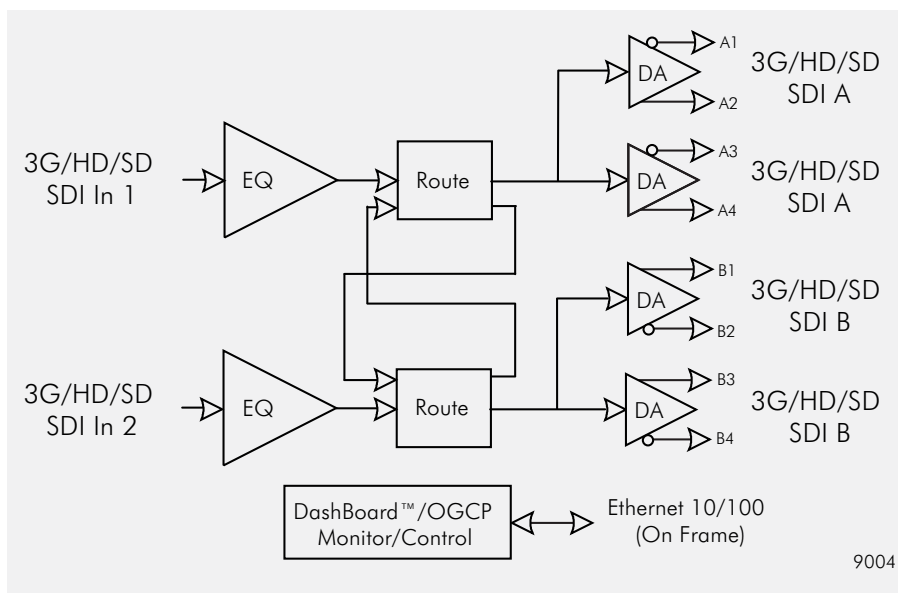
Automatic rate detection/display for all popular data rates

Failsafe mode automatically switches to secondary input on primary input loss

Equalizes up to 160m of Belden 1694A cable at 1.485 Gbit

Remote monitoring via DashBoard™ software or OGCP-9000 remote control panel

Five year warranty



» SPECIFICATIONS

Electrical

Power: 3 watts

3G/HD/SD-SDI Input

Number of Inputs: 2
 Standard: SMPTE 424M, 292M, and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz
 >10 dB at 1.5 GHz to 3 GHz

Cable Length Equalized (w/Belden 1694A)

3 Gbps: 100m
 1.485 Gbps: 160m
 143-360 Mbps: 350m

3G/HD/SD-SDI Output

Number of outputs: 8 (4 ASI Compatible)
 Standard: SMPTE 424M, 292M, and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 1.485 GHz
 >10 dB at 1.5 GHz to 3 GHz
 Jitter (wideband): HD: < 0.2 UI

» ORDERING INFORMATION

9004 Dual 3G/HD/SD Non-Reclocking Distribution Amplifier, 2 X 4 or 1 X 8 Configurations, Failover Mode

RM20-9004-A 20 Slot Frame Rear I/O Module (Standard Width) Dual 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes)

RM20-9004-B/S-HDBNC 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Dual 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes) (HDBNC High Density)

RM20-9004-B/S-DIN 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Dual 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (1x8 or 1x4/1x4 DA Modes) (DIN 1.0/2.3 High Density)

9910DA-AV » ANALOG VIDEO DISTRIBUTION AMPLIFIER

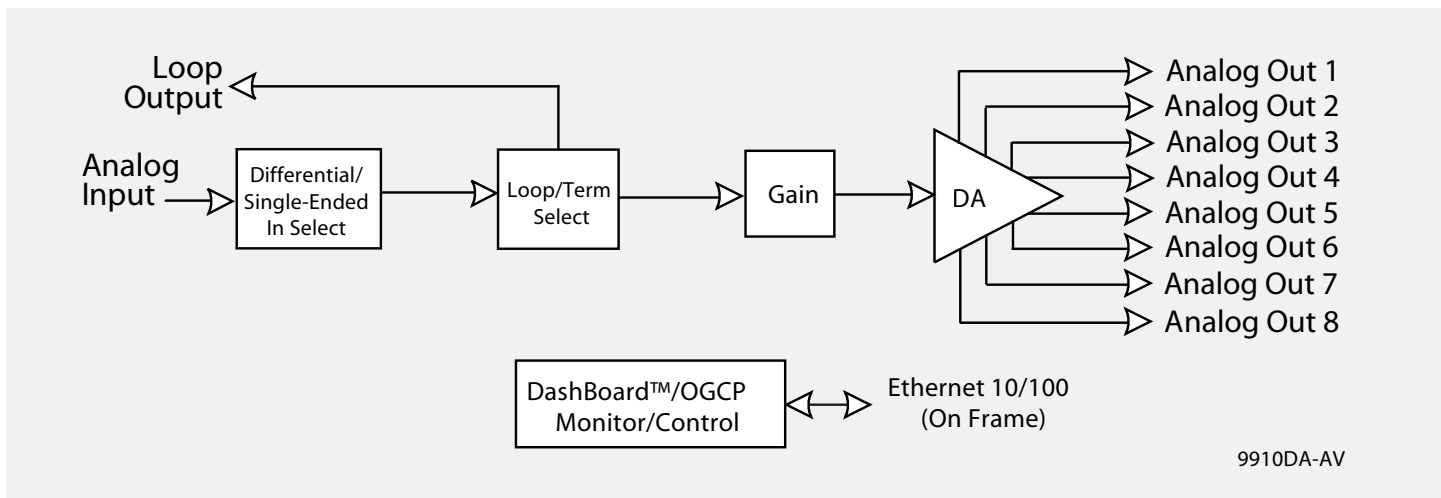
The all-new Cobalt® **9910DA-AV** Analog Video Distribution Amplifier provides 1x8 distribution with one analog input and eight 75Ω analog outputs. Card jumpers allow setting the input as differential (floating ground) or single-ended, and Hi-Z looping input or on-card 75Ω terminated. A trim control located on the front of the card allows gain control. The card can be accessed using DashBoard™ remote control for status monitoring.

» FEATURES

Multi-mode input provides differential or single-ended input and hi-Z looping or card-terminated operation

Remote monitoring via DashBoard™ software or OGCP-9000 Remote Control Panel

Five-year warranty



9910DA-AV

» SPECIFICATIONS

Power
2 Watts

Analog Video Input

Number of inputs: (1)
Impedance: User selectable as hi-Z looping or card-terminated 75Ω
Level: 1 Vp-p, nominal
Return Loss: 46 dB @ 3.58 MHz
Input modes: User selectable as differential/single-ended

Analog Video Outputs

Number of DA outputs: up to (8) Impedance: 75Ω
Level: 1 Vp-p, nominal Looping Output: (1)

Performance

Frequency response: >0.05 dB @ 3.58 MHz Differential Gain: >0.15% @ 3.58 MHz Differential Phase: >0.15° @ 3.58 MHz
S/N: >60 dB; 5 MHz BW

» ORDERING INFORMATION

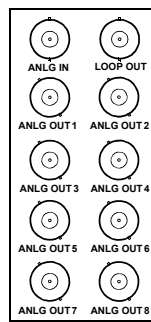
9910DA-AV Analog Video Distribution Amplifier

RM20-9910AV-B 20-Slot Frame Rear I/O Module (Standard Width) (1) Analog Video Input BNC, (8) Analog DA Output BNCs, (1) Input Loop Output BNC

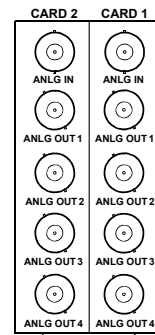
RM20-9910AV-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input BNC, (4) Analog DA Output BNCs (connections are per card)

RM20-9910AV-B/S-DIN 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input, (8) Analog DA Outputs, (1) Input Loop Output (connections are per card; all connectors are DIN 1.0/2.3)

RM20-9910AV-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) Analog Video Input, (8) Analog DA Outputs, (1) Input Loop Output (connections are per card; all connectors are HD-BNC)

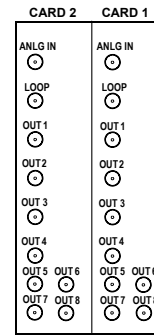


RM20-9910AV-B



RM20-9910AV-A/S

Note: RM20-9910AV-A/S allows only typical single-ended input operation (shield conductor of input BNC tied to GND). Also, this rear module can only be used when input termination (non-looping) is selected using the card jumper.



RM20-9910AV-B/S

Note: RM20-9910AV-B/S allows only typical single-ended input operation (shield conductor of input BNC tied to GND).

9257 » 1X9 MADI AUDIO DISTRIBUTION AMPLIFIER



The 9257 provides an award-winning card-based solution for distribution of AES10 MADI signals. The card supports sampling frequencies up to 96 kHz, with a 64-channel payload supported at the industry standard 48 kHz sampling rate (all other sampling rates specified as valid per AES10-2003 are also supported at various payload capacities). Utilizing the openGear® open-architecture platform, the 9257 offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Up to 20 of the 9257 cards can be installed in a 20-Slot frame.

The 9257 can reliably equalize up to 250m of 1694A, and offers DashBoard™ display and alarm for input signal status and LOS alarms. The card is available with several Rear I/O Module choices that offer BNC, DIN1.0/2.3, or HD-BNC connectors. Full user remote and card-edge monitor/control allows full card status and control access locally or across a standard Ethernet network.

» FEATURES

Card-based design allows scalability, with up to 20 input channels per frame

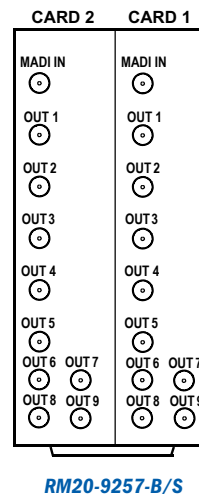
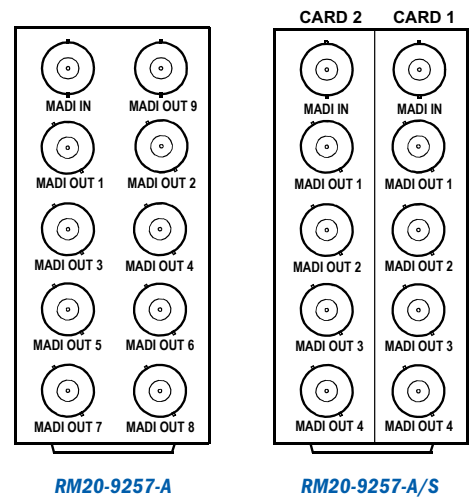
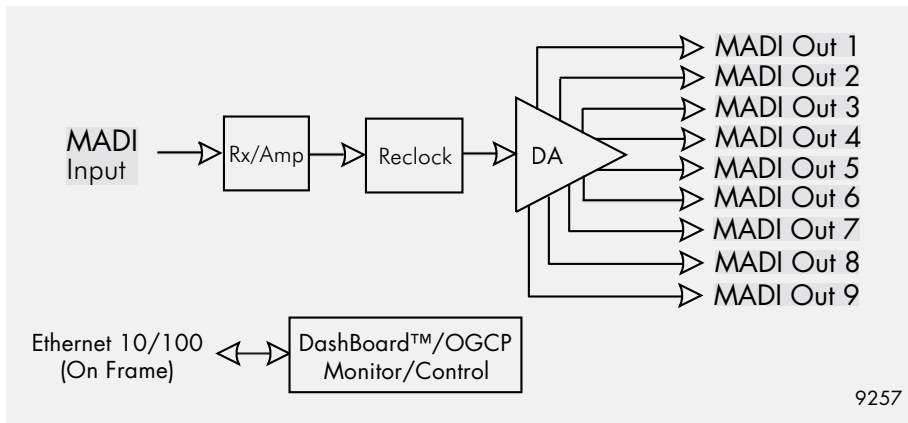
Specifically designed and optimized for AES10 MADI interface

Remote control/monitoring via DashBoard™ software

Low power/high-density design; only 3.3 Watts per card

Up to 250m 1694A receive EQ capability

Five-year warranty



» SPECIFICATIONS

Electrical

Power: 3.3 watts

MADI (AES10-2003) Input

Number of Inputs: 1
 Impedance: 75 Ω
 Data Rate: 125 Mbps
 Level: 0.15 - 0.6 Vp-p

MADI (AES10-2003) Outputs

Number of Outputs: 9 (max.)
 Impedance: 75 Ω
 Level: 0.3 - 0.6 Vp-p
 Jitter: 0.1 UI



» ORDERING INFORMATION

9257 1x9 MADI (AES10-2003) Audio Distribution Amplifier

RM20-9257-A 20-Slot Frame Rear I/O Module (Standard Width) 1 MADI Input BNC, 9 MADI Output BNCs

RM20-9257-A/S 20-Slot Frame Rear I/O Module (Split) Dual MADI Input BNC, 4 MADI Output BNCs per card

RM20-9257-B/S-DIN 20-Slot Frame Rear I/O Module (Split) Dual MADI Input (DIN1.0/2.3), 9 MADI Outputs (All connectors DIN1.0/2.3) per card

RM20-9257-B/S-HDBNC 20-Slot Frame Rear I/O Module (Split) Dual MADI Input (HD-BNC), 9 MADI Outputs (All connectors HD-BNC) per card

9321 » HD/SD EMBEDDER

OPTIONS

Dolby® Digital/E Decoding (+DEC), Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC)



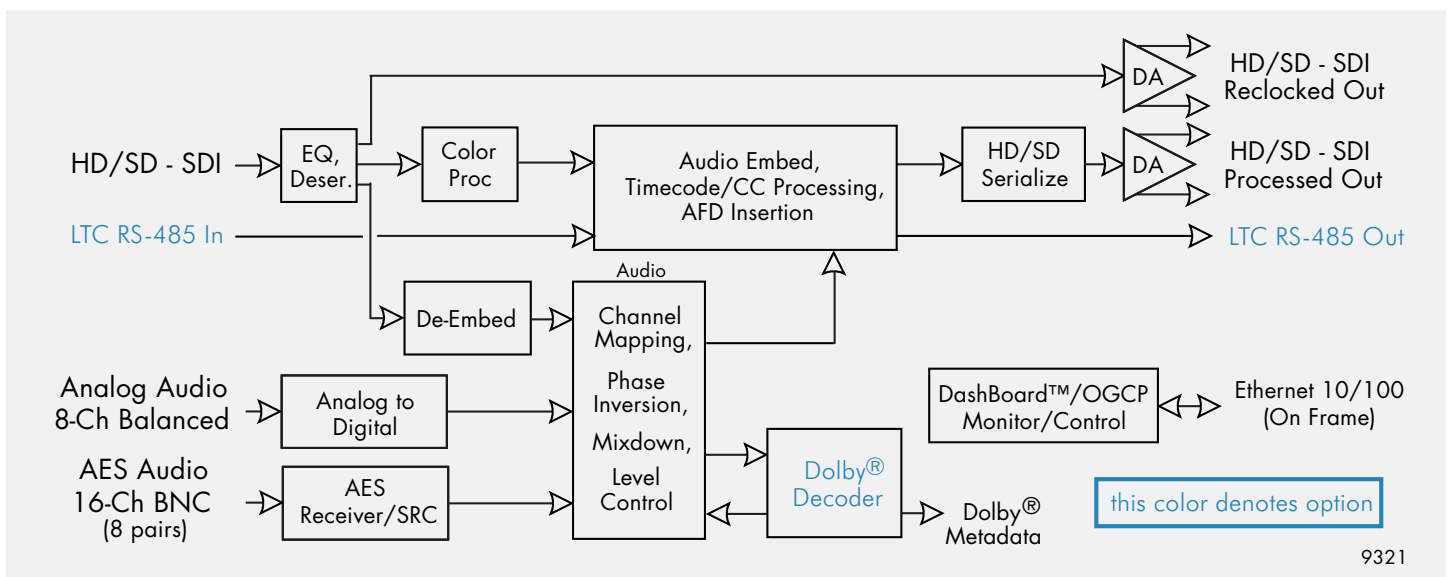
In addition to providing 24-bit basic audio embedding of up to eight analog and 16 AES input channels, the 9321 offers AFD code insertion, full timecode control, and video processing features. Advanced audio features such as AES Sample Rate Converters allow error-free audio embedding from external asynchronous sources.

Timecode can be inserted on the SDI output from selectable sources such as SDI VITC waveform and SD/HD ATC_VITC/ATC_LTC. +LTC option allows LTC input/output on shared port, with bidirectional conversion between VBI and LTC on RS-485 or any audio I/O.

The 9321 features full user remote and card-edge controls for audio levels and routing, video processing, and other functions. Factory presets enable a return to factory settings.

» FEATURES

HD/SD universal digital inputs	Audio channel mapping phase inversion and level control	Dolby® Digital/E decoder option with metadata output	Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel
16 channels of embedding	Four internal tone generators	Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding	Five-year warranty
Eight analog audio inputs with 24-bit conversion	Video processing controls		
24-bit embedded audio processing	Local or remote user controls		



» ORDERING INFORMATION

9321 HD/SD-SDI 16 Channel Audio Embedder with A/V Processing

RM20-9321-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 4 AES Input BNCs, 2 HD/SD-SDI Output BNCs

RM20-9321-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input BNC, 1 Reclocked Output BNC per card, 2 AES Input BNC, 1 HD/SD-SDI Output BNCs per card

RM20-9321-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 6 Analog Audio Inputs, 2 HD/SD-SDI Output BNCs

RM20-9321-C 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input BNC, 8 Analog Audio Inputs, 8 AES Input BNCs, 2 HD/SD-SDI Output BNCs

RM20-9321-D 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 7 AES Input BNCs, 2 HD/SD-SDI Output BNCs

RM20-9321-E 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input BNC, 4 AES In BNCs, 8 Analog Audio In, 2 HD/SD-SDI Out BNCs, RS-485 LTC / Metadata I/O Port

RM20-9321-F 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs, 2 HD/SD-SDI Processed Outputs, 4 AES Inputs, RS-485 LTC / Metadata I/O Port

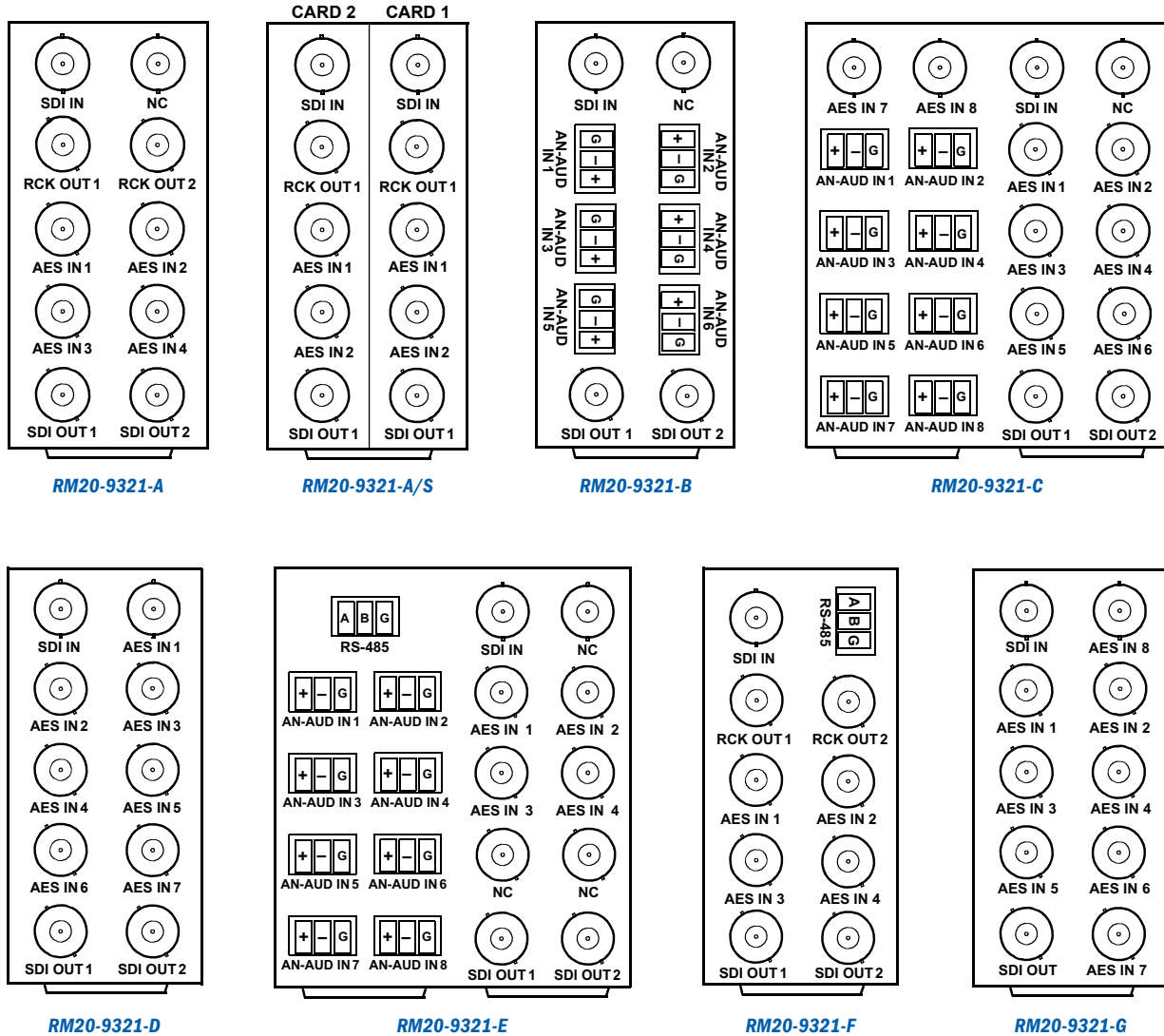
RM20-9321-G 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 8 AES Input BNCs, HD/SD-SDI Output BNC



LINEAR ACOUSTIC



9321



SPECIFICATIONS

Electrical

Power: 10 watts
 Power (Dolby® +DEC option): 12.5 watts

HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 292 and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz

AES Input

Number of Inputs: 16-Ch unbalanced BNC (nominal 48 kHz only)
 Impedance: 75 Ω
 Input Level: 0.1 V to 2.5 V p-p (5 V p-p tolerant)
 Resolution: 24-bit

Analog Audio Input

Number of Inputs: 8-Ch Balanced
 Connector: Removable 3-pin Phoenix
 Signal Level: up to +24 dBu
 Sample Rate: 48 kHz

HD/SD-SDI Output

Number of Outputs: 2 processed
 2 reclocked
 Standard: SMPTE 292 and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz
 Jitter: HD: < 0.15 UI
 SD: < 0.10 UI
 Embedded Audio: 16-Ch SD/HD

9322 » HD/SD DE-EMBEDDER

OPTIONS

Dolby® Digital/E Decoding (+DEC), Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC)



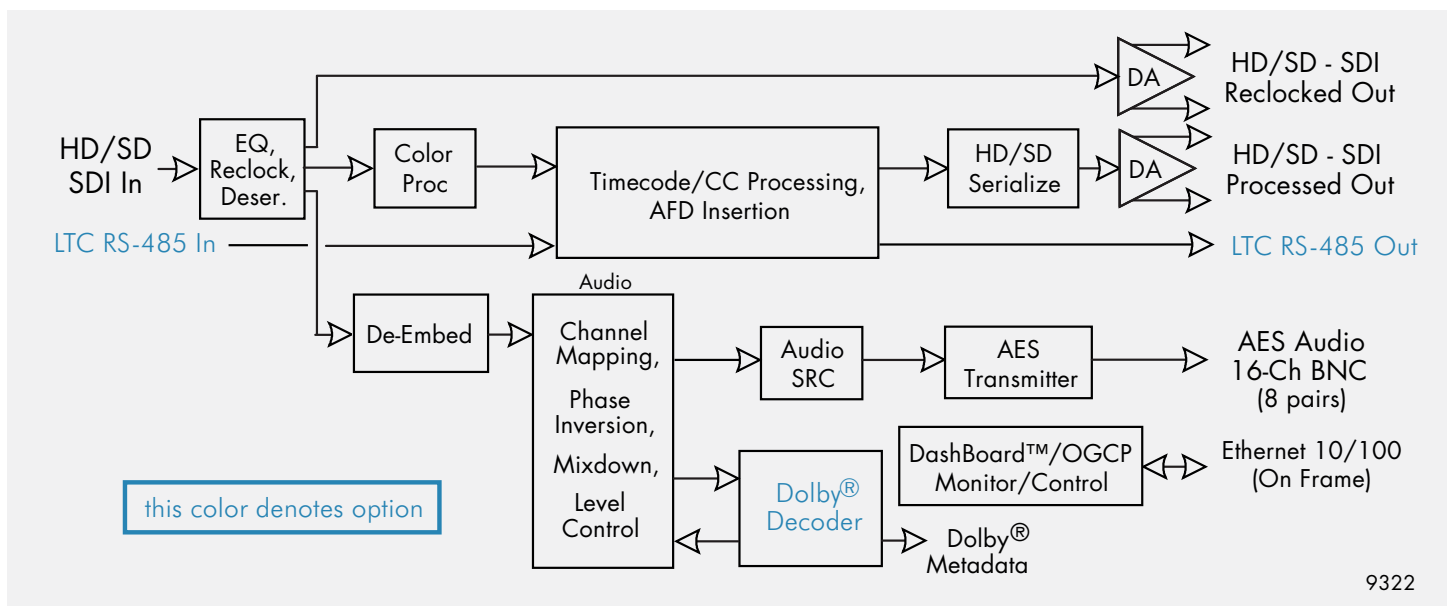
In addition to providing 24-bit basic audio de-embedding to up to 16 AES output channels, the 9322 offers AFD code insertion, full timecode control, and video processing features.

Timecode can be inserted on the SDI output from selectable sources such as SDI VITC waveform, SD/HD ATC_VITC/ATC_LTC. +LTC option allows LTC input/output on shared port, with bidirectional conversion between VBI and LTC on RS-485 or any audio I/O.

The 9322 features full user remote and card-edge controls for audio levels and routing, video processing, and other functions. Factory presets enable a return to factory settings.

» FEATURES

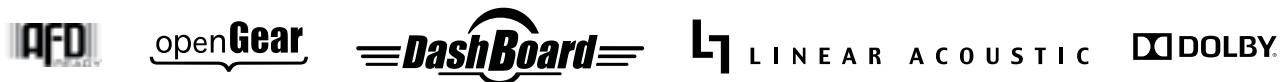
HD/SD universal digital inputs	Audio channel mapping phase inversion and level control	4 internal tone generators	Remote control/monitoring via Dashboard™ or OGCP-9000 remote control panel
16 channels of AES de-embedding	Dolby® decoder option with metadata output	Video processing controls	Five-year warranty
24-bit audio processing		Local or remote user controls	



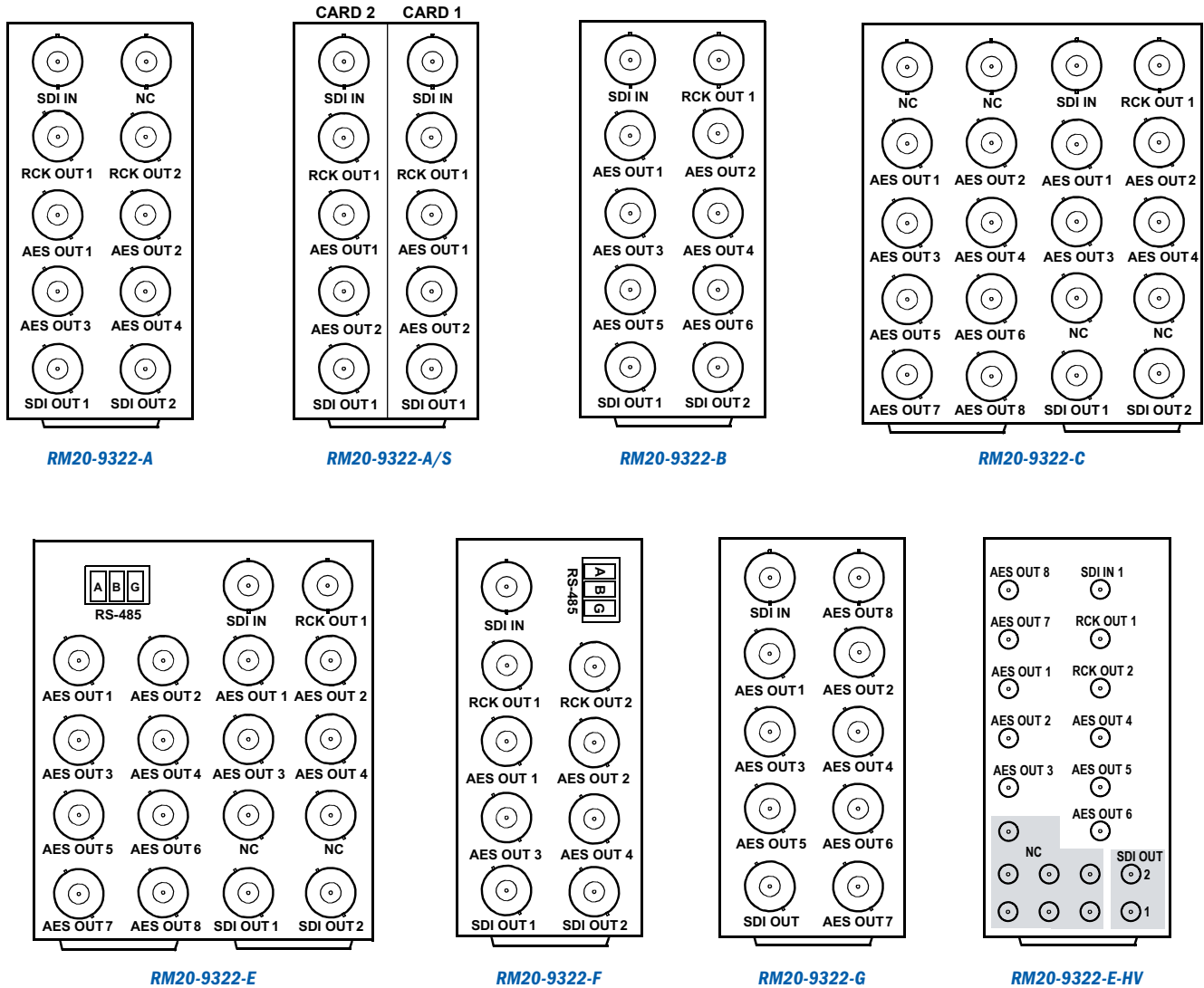
9322

» SPECIFICATIONS

Electrical Power: 9 watts Power (Dolby® +DEC Option): 11.5 watts	AES Output Number of outputs: 16-Ch unbalanced BNC Impedance: 75 Ω Sample Rate: 48 kHz Resolution: 24-bit	HD/SD-SDI Output Number of Outputs: 2 processed 2 reclocked Standard: SMPTE 292 and 259M Signal Level: 800 mV nominal Return Loss: >15 dB at 5 MHz - 270 MHz >12 dB at 270 MHz - 1.485 GHz Jitter: HD: < 0.15 UI SD: < 0.10 UI Embedded Audio: 16-Ch SD/HD
HD/SD-SDI Input Number of Inputs: 1 Standard: SMPTE 292 and 259M Return Loss: >15 dB at 5 MHz - 1.485 GHz		



9322



ORDERING INFORMATION

9322 HD/SD-SDI 16 Channel Audio De-Embedder with A/V Processing

RM20-9322-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 4 AES Output BNCs, 2 HD/SD-SDI Output BNCs

RM20-9322-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input BNC, 1 Reclocked Output BNC per card, 2 AES Output BNCs per card, 1 HD/SD-SDI Output BNC per card

RM20-9322-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 6 AES Output BNCs, 2 HD/SD-SDI Output BNCs

RM20-9322-C 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input BNC, 12 AES Output BNCs, 2 HD/SD-SDI Output BNCs

RM20-9322-E 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input BNC, 8 AES Output BNCs, RS-485 LTC / Metadata I/O Port, 2 HD/SD-SDI Output BNCs

RM20-9322-E-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 8 AES Outputs, 2 HD/SD-SDI Outputs, 2 Reclocked HD/SD-SDI Outputs (All connectors HDBNC)

RM20-9322-E-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 8 AES Outputs, 2 HD/SD-SDI Outputs, 2 Reclocked HD/SD-SDI Outputs (All connectors DIN 1.0/2.3)

RM20-9322-F 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs, 2 HD/SD-SDI Processed Outputs, 4 AES Outputs, RS-485 LTC / Metadata I/O Port

RM20-9322-G 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 8 AES Output BNCs, HD/SD-SDI Output BNC



9323 » HD/SD EMBEDDER / DE-EMBEDDER with A/V Processing

OPTIONS

Dolby® Digital/E Decoding (+DEC), Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC)



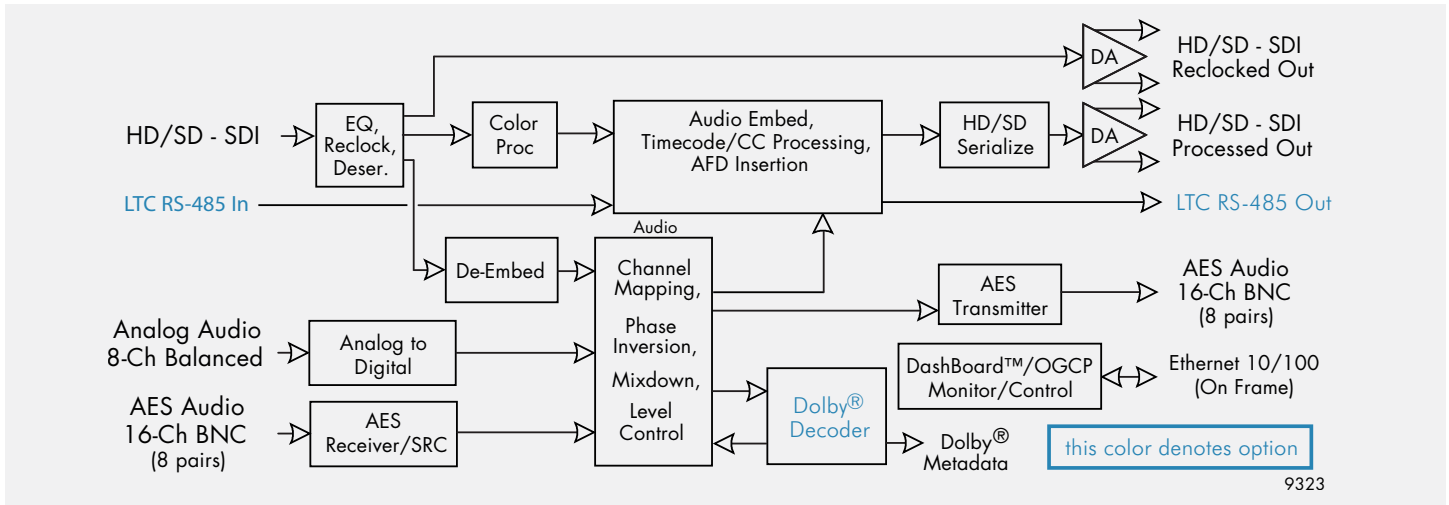
In addition to providing 24-bit basic audio embedding/de-embedding and crosspoint of up to eight analog input channels and 16 AES input/output channels, the 9323 offers AFD code insertion, full timecode control, and video processing features. Advanced audio features such as AES Sample Rate Converters allow error-free audio embedding from external asynchronous sources.

Timecode can be inserted on the SDI output from selectable sources such as SDI VITC waveform, SD/HD ATC_VITC/ATC_LTC. +LTC option allows LTC input/output on shared port, with bidirectional conversion between VBI and LTC on RS-485 or any audio I/O.

The 9323 features full user remote and card-edge controls for audio levels and routing, video processing, and other functions. Factory presets enable a return to factory settings.

» FEATURES

HD/SD universal digital inputs	Audio channel mapping, phase inversion, and level control	Video processing controls	Eight analog audio inputs with 24-bit conversion
16 channels of de-embedding and embedding	Four internal tone generators	Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding	Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panel
24-bit embedded audio processing	Dolby® decoder option with metadata output		Five-year warranty
Local or remote user controls			



» ORDERING INFORMATION

9323 HD/SD-SDI Audio Embedder/De-Embedder with A/V Processing

RM20-9323-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs, AES BNCs: 4 In/Out, 2 HD/SD-SDI Output BNCs

RM20-9323-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input, 1 HD/SD-SDI Reclocked Output per card, AES BNCs: 2 In/Out per card, 1 HD/SD-SDI Output BNC per card

RM20-9323-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 6 Analog Audio Inputs, 2 HD/SD-SDI Output BNCs

RM20-9323-C 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input, AES BNCs: 2 In, 4 In/Out, 2 Out, 8 Analog Audio Inputs, 2 HD/SD-SDI Output BNCs

RM20-9323-D 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI In, AES BNCs: 4 In/Out, 2 Out, 8 Analog Audio In, 2 HD/SD-SDI Out BNCs, RS-485 LTC / Metadata I/O Port

RM20-9323-E 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input, AES BNCs: 4 In/Out, 2 In, 8 Out, RS-485 LTC / Metadata I/O Port, 2 HD/SD-SDI Output BNCs

RM20-9323-F 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, AES BNCs: 4 In/Out, 2 Out, 2 HD/SD-SDI Output BNCs

RM20-9323-G 20-Slot Frame Rear I/O Module (Triple Width) HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs, 8 AES In BNCs, 8 AES Out BNCs, 8 Analog Audio In BNCs, and 2 HD/SD-SDI Output BNCs

RM20-9323-H 20-Slot Frame Rear I/O Module (Double Width) Digital Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 8 AES Out BNCs and 2 SDI Output BNCs

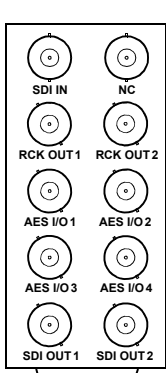
RM20-9323-J 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 AES BNC In/Out, 2 HD/SD-SDI Reclocked Outputs, 2 HD/SD-SDI Processed Outputs, RS-485 LTC / Metadata I/O Port

RM20-9323-K 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 4 AES BNC In/Out, 4 AES Input BNCs, HD/SD-SDI Output BNC

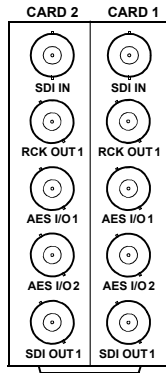
RM20-9323-E-DIN 20-Slot Frame Rear I/O Module (Standard Width, High Density) HD/SD-SDI Input, 8 AES Inputs, 8 AES Outputs, 2 HD/SD-SDI Outputs, 1 Reclocked HD/SD-SDI Output (All connectors DIN1.0/2.3)

RM20-9323-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, High Density) HD/SD-SDI Input, 8 AES Inputs, 8 AES Outputs, 2 HD/SD-SDI Outputs, 1 Reclocked HD/SD-SDI Output (All connectors HD-BNC)

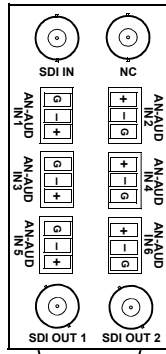
9323



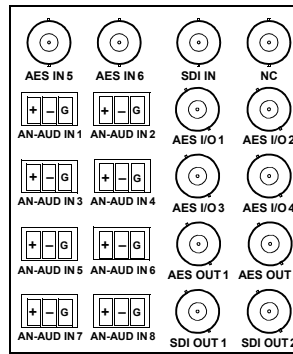
RM20-9323-A



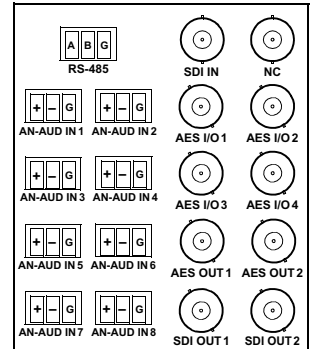
RM20-9323-A/S



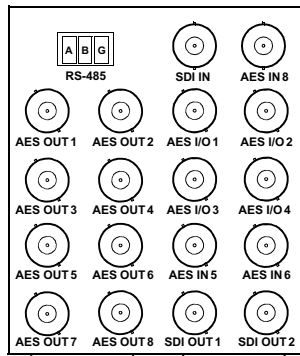
RM20-9323-B



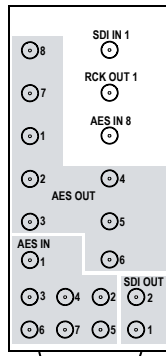
RM20-9323-C



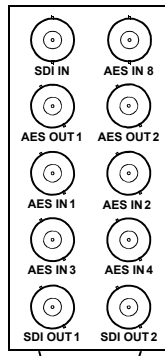
RM20-9323-D



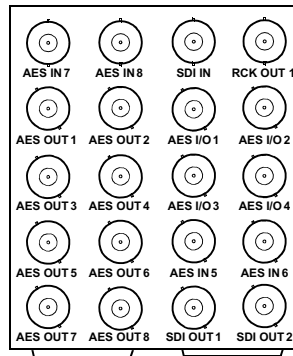
RM20-9323-E



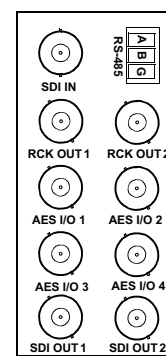
RM20-9323-E-DIN-HDBNC



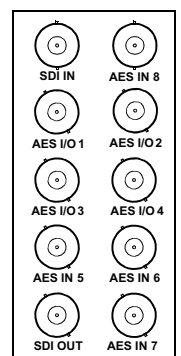
RM20-9323-F



RM20-9323-H



RM20-9323-J



RM20-9323-K

SPECIFICATIONS

Electrical

Power: 10 watts
Power (Dolby® +DEC Option): 12.5 watts

HD/SD-SDI Input

Number of Inputs: 1
Standard: SMPTE 292 and 259M
Return Loss: >15 dB at 5 MHz - 1.485 GHz

AES Input

Number of Inputs: 16-Ch unbalanced BNC (nominal 48 kHz only)
Impedance: 75 Ω
Input Level: 0.1 V to 2.5 V p-p (5 V p-p tolerant)
Resolution: 24-bit

Analog Audio Input

Number of Inputs: 8-Ch Balanced
Connector: Removable 3-pin Phoenix
Signal Level: up to +24 dBu
Sample Rate: 48 kHz

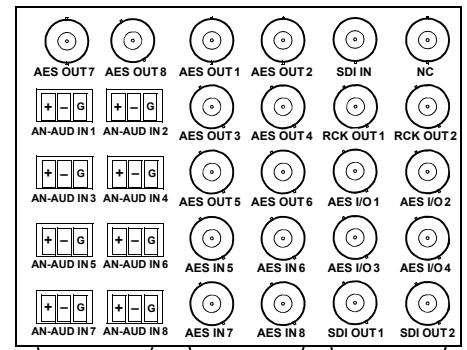
AES Output

Number of Outputs: 16-Ch unbalanced BNC
Impedance: 75 Ω
Sample Rate: 48 kHz
Resolution: 24-bit

HD/SD-SDI Output

Number of Outputs: 2 processed
2 clocked
Standard: SMPTE 292 and 259M
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 270 MHz
>12 dB at 270 MHz - 1.485 GHz

Jitter: HD: < 0.15 UI
SD: < 0.10 UI
Embedded Audio: 16-Ch SD/HD



RM20-9323-G



LINEAR ACOUSTIC



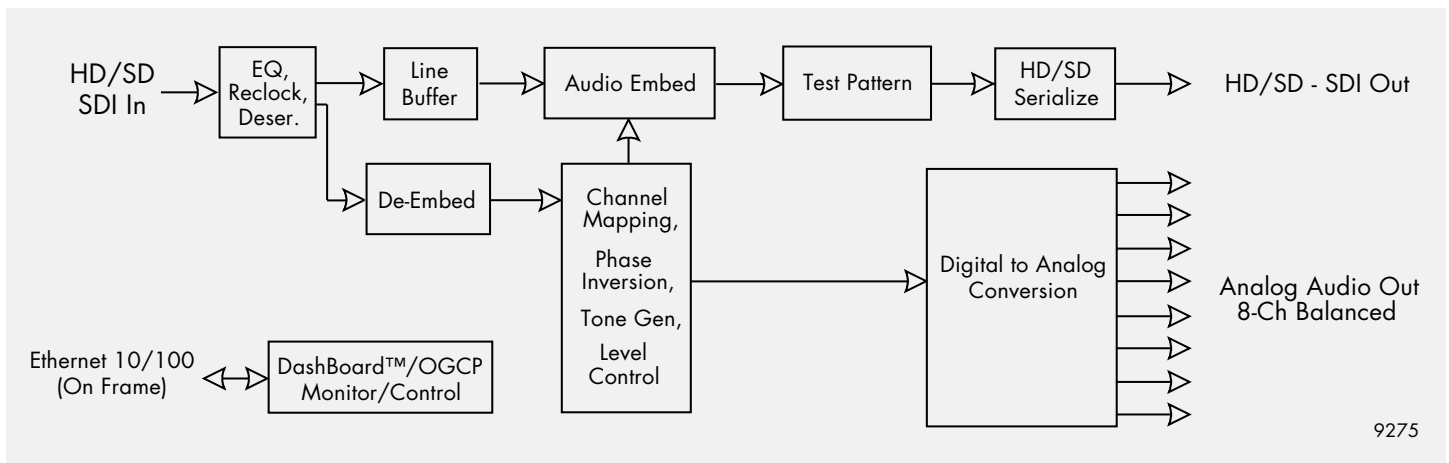
9275 » HD-SD-SDI ANALOG AUDIO DE-EMBEDDER



The 9275-8C accepts an HD/SD-SDI input and provides up to eight de-embedded balanced analog output channels. The 9275-4C provides up to four de-embedded balanced analog output channels. The cards offer full 24-bit audio D-to-A, processing/routing control (card edge and remote control) for individual channel gain with ganging, delay (up to one second), phase invert, as well as channel summing. User presets allow fast and easy recall of custom settings.

» FEATURES

Conforms to SMPTE 259M and SMPTE 292M	Audio channel mapping, phase inversion and level control	Silence output on loss of audio input	Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel
Automatic detection of incoming data rate	Programmable video output on SDI input loss	Programmable silence detection and timeout thresholds	Five-year warranty
LED indicators for signal presence and data rate			



9275

» SPECIFICATIONS

Electrical

Power (4-Ch): 8 watts
Power (8-Ch): 9 watts

HD/SD-SDI Input

Number of Inputs: 1
Standard: SMPTE 292 and 259M-C
Return Loss: >15 dB at 1.5 GHz

HD/SD-SDI Output

Number of Outputs: 1 processed

Analog Audio Outputs

9275-4C: 4-Ch balanced outputs
9275-8C: 8-Ch balanced outputs
Maximum Output Level: +27 dBu
Frequency Response: ±0.07 dB (22 Hz to 20 kHz @ Fs=48 kHz)
Signal to Noise Ratio: -90 dB
THD: > -76 dB
Crosstalk: <-80 dB (20 Hz to 20 kHz)

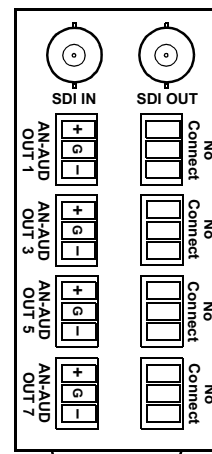
» ORDERING INFORMATION

9275-4C HD/SD-SDI 4 Channel Audio De-Embedder with Analog Audio

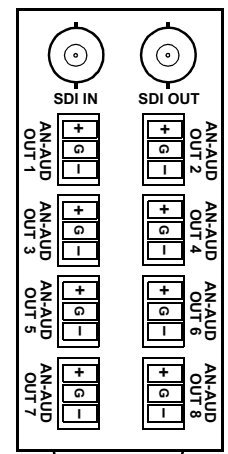
9275-8C HD/SD-SDI 8 Channel Audio De-Embedder with Analog Audio

RM20-9275-4C-B 20-Slot Frame Rear I/O Module (Standard Width) 1 HD/SD-SDI Input BNC, 1 Loop Output BNC, 4 Analog Audio Outputs

RM20-9275-8C-B 20-Slot Frame Rear I/O Module (Standard Width) 1 HD/SD-SDI Input BNC, 1 Loop Output BNC, 8 Analog Audio Outputs



RM20-9275-4C-B



RM20-9275-8C-B



9371-EMDE » SDI – AES – MADI EMBEDDER/DE-EMBEDDER

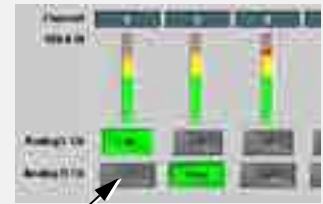


The 9371 offers a comprehensive solution for digital audio transport conversion and embedding/de-embedding. A full unrestricted audio crosspoint provides channel routing between any channels on an SDI stream, discrete AES-3id, and AES-10 MADI interfaces.

The card MADI interface supports a 64-channel payload at the industry standard 48 kHz sampling rate, and can reliably receive from 1694A cable runs up to 250m, thereby allowing longer MADI cable runs without resorting to fiber cabling. All SDI embedding and SDI output timing is timed in common to a selected timing source. A convenient 2-channel analog confidence monitor output allows monitoring of any selected input or output. The line-level output pair directly interfaces with audio monitoring units or powered monitors.

Utilizing the openGear® open-architecture platform, the 9371 offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Full user remote monitor/control allows full card status and control access locally or across a standard Ethernet network.

DashBoard PPM meters for all input/output audio channels assist in rapidly locating and assessing content and line-up on any group of channels



Direct Monitor buttons provide direct routing of any channel pair to a confidence monitor analog audio output pair

Alternate Base Models

9371-EM

SDI – AES – MADI Embedder

9371-DE

SDI – AES – MADI De-Embedder

» FEATURES

Unrestricted de-embed/embed from multiple digital audio sources – embedded SDI audio, MADI, and discrete AES-3id (BNC) – all on the same card

De-embed, route, channel swap, mix, and embed between SDI stream and discrete digital streams

DashBoard PPM meters for all inputs and outputs helps in easily locating and assessing channel content and line-up

Built-in flexible general-purpose mixing between any audio channels from any input to any card output

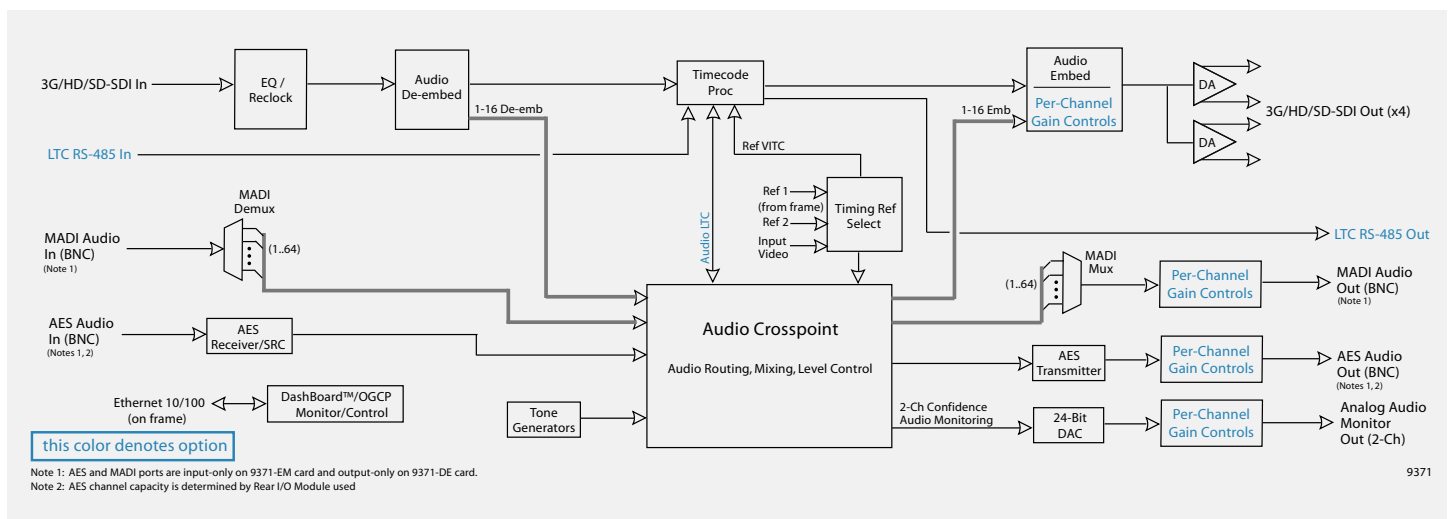
Up to 250m 1694A MADI receive capability

Built-in 2-channel analog audio confidence monitor outputs provide instant pushbutton routing of any input/output pair to playout monitors

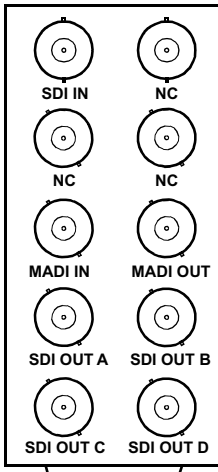
Built-in multi-frequency configurable tone generators

Remote control/monitoring via DashBoard™ software

Five-year warranty

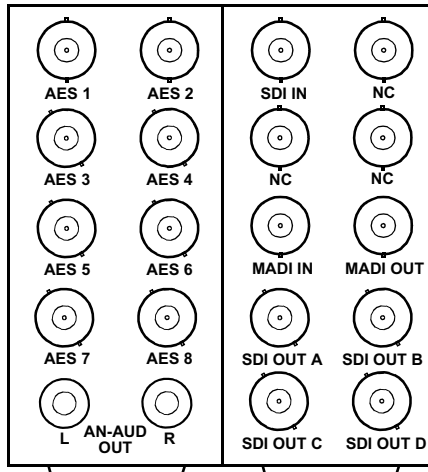


9371-EMDE



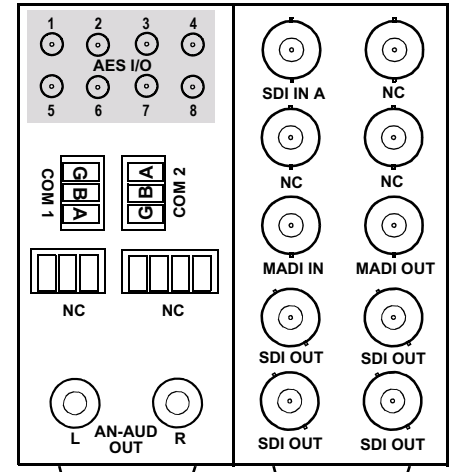
Note: MADI IN port only on 9371-EM card and MADI OUT port only on 9371-DE card.

RM20-9371-C



Note: AES ports are GUI-configurable as inputs or outputs on 9371-EMDE card. AES ports and MADI ports are input-only on 9371-EM card and output-only on 9371-DE card.

RM20-9371-E



Note: AES ports are GUI-configurable as inputs or outputs on 9371-EMDE card. AES ports and MADI ports are input-only on 9371-EM card and output-only on 9371-DE card.

RM20-9371-F

ORDERING INFORMATION

9371-EMDE SDI - AES - MADI Embedder/De-Embedder

9371-EM SDI - AES - MADI Embedder

9371-DE SDI - AES - MADI De-Embedder

RM20-9371-C RM20-9371-C 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input, (4) 3G/HD/SD-SDI Outputs (x4 DA), (1) MADI BNC Input, (1) MADI BNC Output

RM20-9371-E 20-Slot Frame Rear I/O Module (Double Width) (1) 3G/HD/SD-SDI Input, (4) 3G/HD/SD-SDI Outputs (x4 DA), (8) AES I/O BNCs, (1) MADI BNC Input, (1) MADI BNC Output, (2) Stereo Unbalanced Analog Audio Outputs (RCA)

RM20-9371-F-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (1) 3G/HD/SD-SDI Input BNC, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are HD-BNC)

RM20-9371-F-DIN 20-Slot Frame Rear I/O Module (Double Width) (1) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are DIN 1.0/2.3)

+LTC LTC In/Out Option

+GAIN Output Gain Controls Option

SPECIFICATIONS

Power

<20 Watts (maximum)

SDI Input/Output

Capacity: 1 In, 1 Out
 Standards: SMPTE 259M, SMPTE 292M, SMPTE 425 A and B
 Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
 Return Loss: >15 dB up to 1.485 GHz
 >10 dB up to 2.970 GHz
 Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
 Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Timing Reference Input

Sources: Selectable from frame-supplied external reference REF1 or REF2 or SDI video input. Timing source provides output PLL common timing
 External Reference Signal: SMPTE 170M/318M "Black Burst" SMPTE 274M/296M "Tri-Level"
 Return Loss: >35 dB up to 5.75 MHz

AES-3id Audio Input/Output

Capacity: Up to 8 BNC ports (user selectable as input or output). Practical capacity determined by Rear I/O Module used.
 Physical Interface: BNC per AES3-id
 Input Level: 0.2 to 2 Vp-p
 Output Level: 1.0 Vp-p
 Impedance: 75Ω
 Return Loss: >15 dB up to 6.144 MHz
 Input SRC Range: 32 to 96 kHz
 Input SRC Performance: >130 dB THD+N

MADI (AES10-2003) Input/Output

Number of Inputs/Outputs: 1 BNC Input, 1 BNC Output
 Supported Sample Rate: 48 kHz only
 Input/Output Impedance: 75 Ω
 Input Data Rates: 125 Mbps
 Input Level: 0.15 - 0.6 Vp-p
 Output Level: 0.3 - 0.6 Vp-p
 Output Jitter: 0.1 UI

Analog Audio Confidence Monitor Output

Channel Complement: L and R, user-assigned sources direct from any input channel or mixed channels comprising a 2-channel mix
 Output Type: 2-channel unbalanced, consumer line-level

Note: AES-3id and MADI should be synchronous with SDI stream to ensure clean audio cross-routing.

Note: Analog audio output available only in conjunction with Rear I/O Module equipped with analog audio outputs

9372-EMDE » DUAL-STREAM SDI – AES – MADI EMBEDDER/DE-EMBEDDER

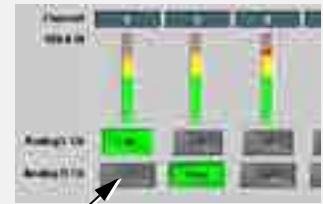


The 9372 offers a comprehensive solution for digital audio transport conversion and embedding/de-embedding. A full unrestricted audio crosspoint provides channel routing between any channels on up to two SDI streams, discrete AES-3id, and AES-10 MADI interfaces.

The card MADI interface supports a 64-channel payload at the industry standard 48 kHz sampling rate, and can reliably receive from 1694A cable runs up to 250m, thereby allowing longer MADI cable runs without resorting to fiber cabling. All SDI embedding and SDI output timing is timed in common to a selected timing source. A convenient 2-channel analog confidence monitor output allows monitoring of any selected input or output. The line-level output pair directly interfaces with audio monitoring units or powered monitors.

Utilizing the openGear® open-architecture platform, the 9372 offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Full user remote monitor/control allows full card status and control access locally or across a standard Ethernet network.

DashBoard PPM meters for all input/output audio channels assist in rapidly locating and assessing content and line-up on any group of channels



Direct Monitor buttons provide direct routing of any channel pair to a confidence monitor analog audio output pair

Alternate Base Models

9372-EM

Dual-Stream SDI – AES – MADI Embedder

9372-DE

Dual-Stream SDI – AES – MADI De-Embedder

» FEATURES

Unrestricted de-embed/embed from multiple digital audio sources – embedded SDI audio, MADI, and discrete AES-3id (BNC) – all on the same card

De-embed, route, channel swap, mix, and embed between up to two discrete SDI streams and discrete digital streams

DashBoard PPM meters for all inputs and outputs helps in easily locating and assessing channel content and line-up

Built-in flexible general-purpose mixing between any audio channels from any input to any card output

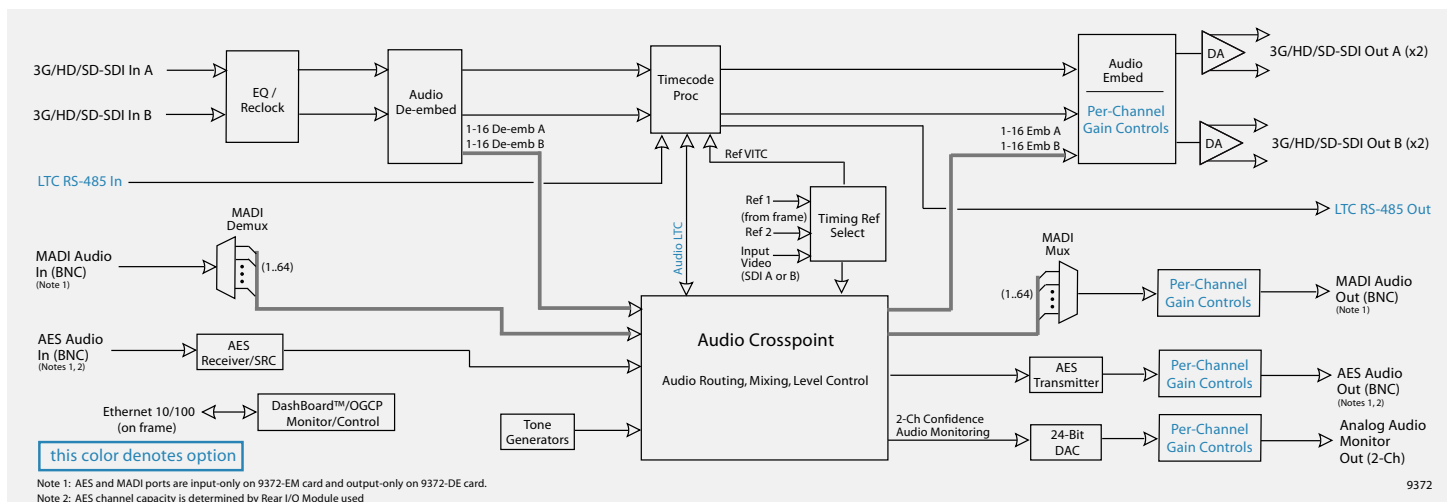
Up to 250m 1694A MADI receive capability

Built-in 2-channel analog audio confidence monitor outputs provide instant pushbutton routing of any input/output pair to playout monitors

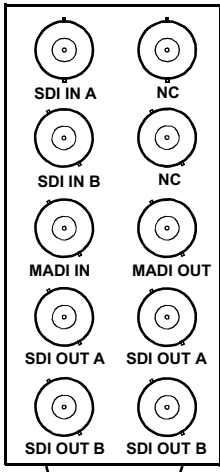
Built-in multi-frequency configurable tone generators

Remote control/monitoring via DashBoard™ software

Five-year warranty

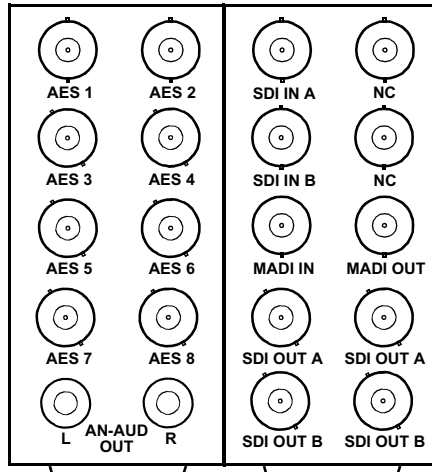


9372-EMDE



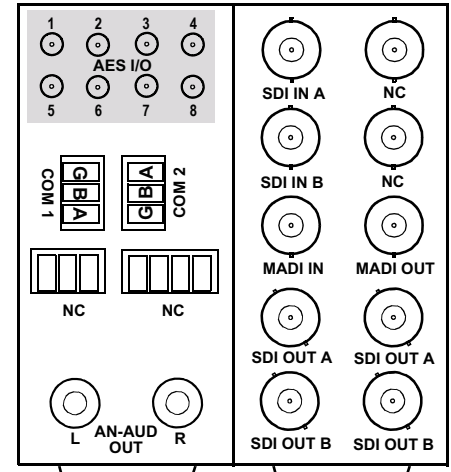
Note: MADI IN port only on 9372-EM card and MADI OUT port only on 9372-DE card.

RM20-9372-C



Note: AES ports are GUI-configurable as inputs or outputs on 9372-EMDE card. AES ports and MADI ports are input-only on 9372-EM card and output-only on 9372-DE card.

RM20-9372-E



Note: AES ports are GUI-configurable as inputs or outputs on 9372-EMDE card. AES ports and MADI ports are input-only on 9372-EM card and output-only on 9372-DE card.

RM20-9372-F

ORDERING INFORMATION

9372-EMDE Dual-Stream SDI - AES - MADI Embedder/De-Embedder

9372-EM Dual-Stream SDI - AES - MADI Embedder

9372-DE Dual-Stream SDI - AES - MADI De-Embedder

RM20-9372-C 20-Slot Frame Rear I/O Module (Standard Width) SDI A/B 3G/HD/SD-SDI Inputs, (2) SDI A 3G/HD/SD-SDI Outputs, (2) SDI B 3G/HD/SD-SDI Outputs, (1) MADI BNC Input, (1) MADI BNC Output

RM20-9372-E 20-Slot Frame Rear I/O Module (Double Width) SDI A/B 3G/HD/SD-SDI Inputs, (2) SDI A 3G/HD/SD-SDI Outputs, (2) SDI B 3G/HD/SD-SDI Outputs, (8) AES I/O BNCs, (1) MADI BNC Input, (1) MADI BNC Output, (2) Stereo Unbalanced Analog Audio Outputs (RCA)

RM20-9372-F-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (2) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are HD-BNC)

RM20-9372-F-DIN 20-Slot Frame Rear I/O Module (Double Width) (2) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are DIN 1.0/2.3)

+LTC LTC In/Out Option

+GAIN Output Gain Controls Option

SPECIFICATIONS

Power
<20 Watts (maximum)

SDI Input/Output

Capacity: 2 In, 2 Out
Standards: SMPTE 259M, SMPTE 292M, SMPTE 425 A and B
Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz
>10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: All inputs must be synchronous (e.g., all frame synced to same reference) to assure clean audio cross-routing between SDI streams. AES-3id and MADI should also be synchronous with selected SDI stream(s) to ensure clean audio cross-routing.

Timing Reference Input

Sources: Selectable from frame-supplied external reference REF1 or REF2 or any of two SDI video inputs. Timing source provides output PLL common timing
External Reference Signal: SMPTE 170M/318M "Black Burst" SMPTE 274M/296M "Tri-Level"
Return Loss: >35 dB up to 5.75 MHz

AES-3id Audio Input/Output

Capacity: Up to 8 BNC ports (user selectable as input or output). Practical capacity determined by Rear I/O Module used.
Physical Interface: BNC per AES3-id
Input Level: 0.2 to 2 Vp-p
Output Level: 1.0 Vp-p
Impedance: 75Ω
Return Loss: >15 dB up to 6.144 MHz
Input SRC Range: 32 to 96 kHz
Input SRC Performance: >130 dB THD+N

MADI (AES10-2003) Input/Output

Number of Inputs/Outputs: 1 BNC Input, 1 BNC Output
Supported Sample Rate: 48 kHz only
Input/Output Impedance: 75 Ω
Input Data Rates: 125 Mbps
Input Level: 0.15 - 0.6 Vp-p
Output Level: 0.3 - 0.6 Vp-p
Output Jitter: 0.1 UI

Analog Audio Confidence Monitor Output

Channel Complement: L and R, user-assigned sources direct from any input channel or mixed channels comprising a 2-channel mix
Output Type: 2-channel unbalanced, consumer line-level

Note: Analog audio output available only in conjunction with Rear I/O Module equipped with analog audio outputs

9374-EMDE » QUAD-STREAM SDI – AES – MADI EMBEDDER/DE-EMBEDDER

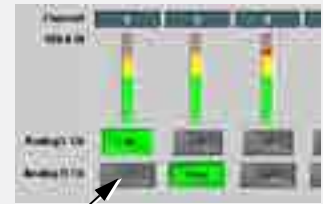


The 9374 offers our most comprehensive solution for digital audio transport conversion and embedding/de-embedding. A full unrestricted audio crosspoint provides channel routing between any channels on up to four SDI streams, discrete AES-3id, and AES-10 MADI interfaces.

The card MADI interface supports a 64-channel payload at the industry standard 48 kHz sampling rate, and can reliably receive from 1694A cable runs up to 250m, thereby allowing longer MADI cable runs without resorting to fiber cabling. All SDI embedding and SDI output timing is timed in common to a selected timing source. A convenient 2-channel analog confidence monitor output allows monitoring of any selected input or output. The line-level output pair directly interfaces with audio monitoring units or powered monitors.

Utilizing the openGear® open-architecture platform, the 9374 offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Full user remote monitor/control allows full card status and control access locally or across a standard Ethernet network.

DashBoard PPM meters for all input/output audio channels assist in rapidly locating and assessing content and line-up on any group of channels



Direct Monitor buttons provide direct routing of any channel pair to a confidence monitor analog audio output pair

Alternate Base Models

9374-EM

Quad-Stream SDI – AES – MADI Embedder

9374-DE

Quad-Stream SDI – AES – MADI De-Embedder

» FEATURES

Unrestricted de-embed/embed from multiple digital audio sources – embedded SDI audio, MADI, and discrete AES-3id (BNC) – all on the same card

De-embed, route, channel swap, mix, and embed between up to four discrete SDI streams and discrete digital streams

DashBoard PPM meters for all inputs and outputs helps in easily locating and assessing channel content and line-up

Built-in flexible general-purpose mixing between any audio channels from any input to any card output

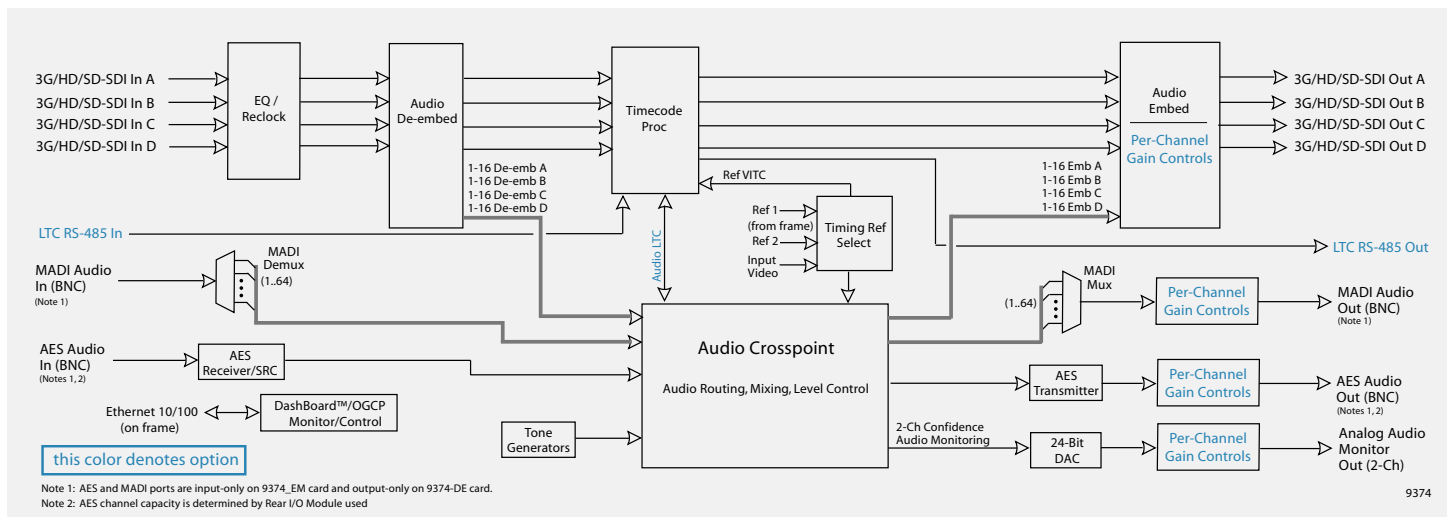
Up to 250m 1694A MADI receive capability

Built-in 2-channel analog audio confidence monitor outputs provide instant pushbutton routing of any input/output pair to payout monitors

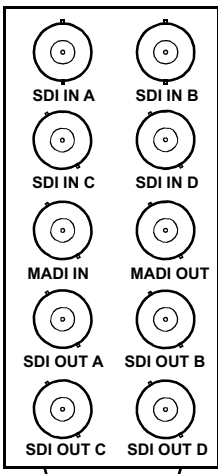
Built-in multi-frequency configurable tone generators

Remote control/monitoring via DashBoard™ software

Five-year warranty

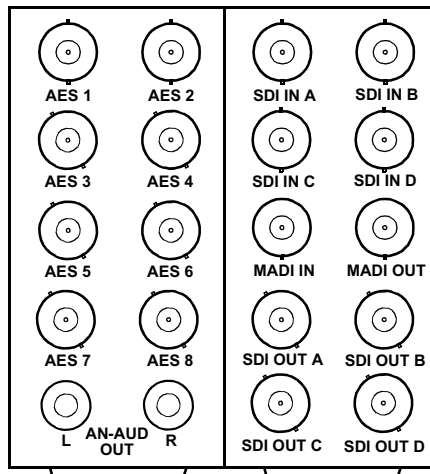


9374-EMDE



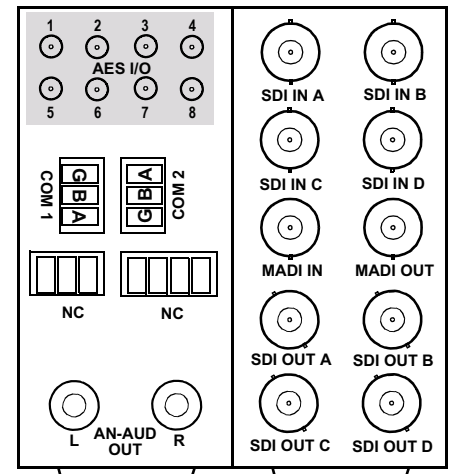
Note: MADI IN port only on 9374-EM card and MADI OUT port only on 9374-DE card.

RM20-9374-C



Note: AES ports are GUI-configurable as inputs or outputs on 9374-EMDE card. AES ports and MADI ports are input-only on 9374-EM card and output-only on 9374-DE card.

RM20-9374-E



Note: AES ports are GUI-configurable as inputs or outputs on 9374-EMDE card. AES ports and MADI ports are input-only on 9374-EM card and output-only on 9374-DE card.

RM20-9374-F-DIN-HDBNC

ORDERING INFORMATION

9374-EMDE Quad-Stream SDI - AES - MADI Embedder/De-Embedder

9374-EM Quad-Stream SDI - AES - MADI Embedder

9374-DE Quad-Stream SDI - AES - MADI De-Embedder

RM20-9374-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs, (1) MADI BNC Input, (1) MADI BNC Output

RM20-9374-E 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES I/O BNCs, (1) MADI BNC Input, (1) MADI BNC Output, (2) Stereo Unbalanced Analog Audio Outputs (RCA)

RM20-9374-F-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are HD-BNC)

RM20-9374-F-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) MADI Input BNC, (1) MADI Output BNC, (2) RS-485 LTC Inputs, (2) Analog Audio Out (unbalanced RCA), (8) AES I/O (AES connectors are DIN 1.0/2.3)

+LTC LTC In/Out Option

+GAIN Output Gain Controls Option

SPECIFICATIONS

Power

<20 Watts (maximum)

SDI Input/Output

Capacity: 4 In, 4 Out
 Standards: SMPTE 259M, SMPTE 292M, SMPTE 425 A and B
 Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
 Return Loss: >15 dB up to 1.485 GHz
 >10 dB up to 2.970 GHz
 Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
 Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: All inputs must be synchronous (e.g., all frame synced to same reference) to assure clean audio cross-routing between SDI streams. Multiple simultaneous formats are supported on a limited basis (e.g., HD on SDI Inputs A/B and SD on SDI Inputs C/D). AES-3id and MADI should also be synchronous with selected SDI stream(s) to ensure clean audio cross-routing.

Timing Reference Input

Sources: Selectable from frame-supplied external reference REF1 or REF2 or any of four SDI video inputs. Timing source provides output PLL common timing
 External Reference Signal: SMPTE 170M/318M "Black Burst" SMPTE 274M/296M "Tri-Level"
 Return Loss: >35 dB up to 5.75 MHz

AES-3id Audio Input/Output

Capacity: Up to 8 BNC ports (user selectable as input or output). Practical capacity determined by Rear I/O Module used.
 Physical Interface: BNC per AES3-id
 Input Level: 0.2 to 2 Vp-p
 Output Level: 1.0 Vp-p
 Impedance: 75Ω
 Return Loss: >15 dB up to 6.144 MHz
 Input SRC Range: 32 to 96 kHz
 Input SRC Performance: >130 dB THD+N

MADI (AES10-2003) Input/Output

Number of Inputs/Outputs: 1 BNC Input, 1 BNC Output
 Supported Sample Rate: 48 kHz only
 Input/Output Impedance: 75 Ω
 Input Data Rates: 125 Mbps
 Input Level: 0.15 - 0.6 Vp-p
 Output Level: 0.3 - 0.6 Vp-p
 Output Jitter: 0.1 UI

Analog Audio Confidence Monitor Output

Channel Complement: L and R, user-assigned sources direct from any input channel or mixed channels comprising a 2-channel mix
 Output Type: 2-channel unbalanced, consumer line-level

Note: Analog audio output available only in conjunction with Rear I/O Module equipped with analog audio outputs



9931-EMDE » 3G/HD/SD-SDI EMBEDDER/DE-EMBEDDER



Fusion3G

The award-winning 3G/HD/SD Fusion3G® 9931-EMDE card offers advanced audio support. Full audio support includes per-channel audio delay. Remote control is quick and easy with the free DashBoard™ remote control software or the Cobalt OGCP-9000 series remote control panels.

You can select from options to add (as inputs and/or outputs) fiber, analog video, and analog audio. Other options include color correction, Dolby® E/AC-3 encoding and decoding (with both decode and re-encode on the same card), ITU/ATSC/EBU compliant loudness metering, and Linear Acoustic® upmixing and loudness processing.

Alternate Base Models:

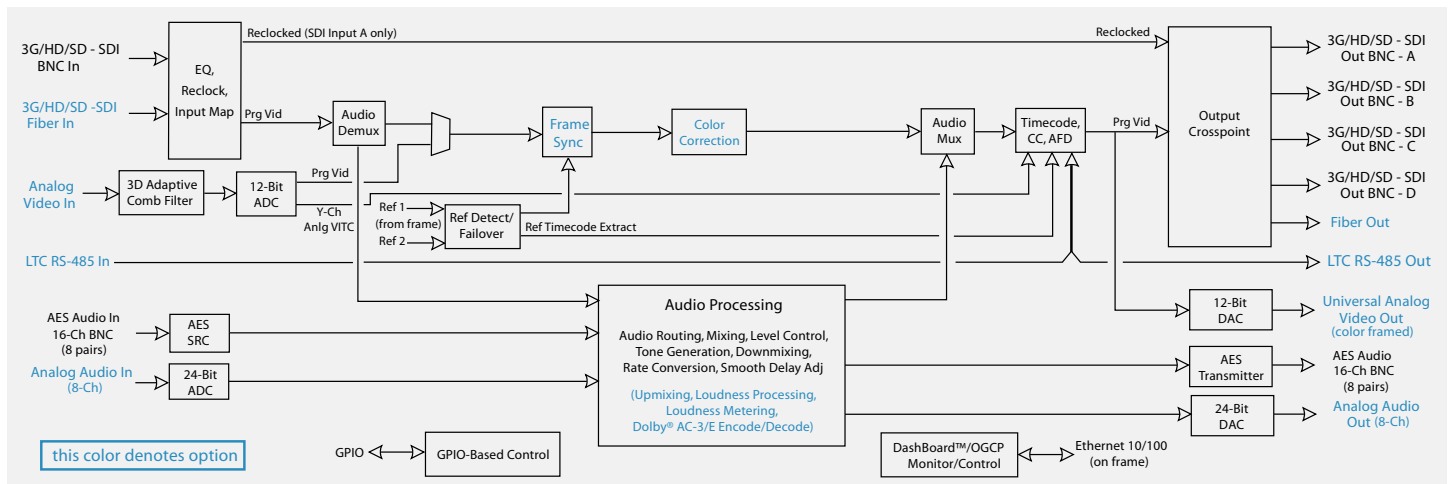
9931-EM

3G/HD/SD-SDI Embedder

9931-DE

3G/HD/SD-SDI De-Embedder

Where full embedding/de-embedding capability is not required, the 9931 card is available as the following base model versions (if desired later, any of these versions can be field upgraded to 9931-EMDE functionality using a firmware upgrade, without removing the card from its frame).



» STANDARD FEATURES

Full 3G/HD/SD-SDI support on BNC coax

Advanced audio processing allows routing, gain, delay, and flexible mixing.

GPIO ports with user-definable functions and an advanced data logging feature provide the utmost in system automation and monitoring

Full SMPTE timecode support with translation between formats. Timecode sources selectable from SDI and analog video inputs, reference, and internally generated.

Centralized GUI remote control using DashBoard™ software and Cobalt OGCP-9000 remote control panels – custom settings saved as presets can be recalled manually, or with GPI or events-based triggering

Five-year warranty

» OPTIONAL FEATURES

Fiber 3G/HD/SD inputs/outputs. Fiber ports use blind mating interface, allowing card swapping (including optical transceivers) with no cable disconnection.

Analog audio I/O support

LTC input/out and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O

AES embedding/de-embedding. AES ports are GUI selectable as input or output. Each input has independent sample rate converter.

Universal HD/SD analog I/O. Composite video input sources converted with 3D comb decoder, mitigating common decoding artifacts. Composite video output is color-framed to match reference burst, plus user offset.

Linear Acoustic® loudness processing and automatic upmixer technology

Full Dolby® E / AC-3 encoding and decoding options, including decode + re-encode and multiple AC-3 stream encoding on the same card.



9931-EMDE » OPTIONS

» I/O OPTIONS

LTC RS-485/AUDIO INPUT/OUTPUT (+LTC)

Provides LTC input/output and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.

8-PORT AES OUTPUT EXPANSION (+AES16)

Provides the 16-channel embed/de-embed of option +AES (see above) as well as eight added AES output ports to provide a total complement of AES I/O 1 thru AES I/O 8 and added ports AES OUT 1 thru AES OUT 8. Allows 16 channels of AES embedding and 16 channels of AES de-embedding simultaneously. (Option is not available as a field upgrade and also requires Rear I/O Module RM20-9931-G.)

FIBER INPUTS/OUTPUTS (+FRX / +FTX / +FRXTX / +FRRX / +FTXTX)*

Provides one or two fiber connections per card. Inputs can serve any function in the product, outputs can be assigned from any function in the card. Connector type is dual LC with blind-mate connectors cards fully swappable.

UNIVERSAL ANALOG VIDEO INPUTS/OUTPUTS (+ANV)*

Provides an analog video input and output (CVBS, component, RGB (sync on green))

ANALOG AUDIO INPUTS/OUTPUTS (+ANA)*

Provides up to eight channels (total) of balanced analog audio inputs and outputs

*Requires expansion Rear Module (for example, 9931-EMDE+ANV requires RM20-9931-XB expansion Rear Module)

» VIDEO OPTIONS

COLOR CORRECTION (+COLOR)

Provides independent RGB channel controls for luma, black, and gamma. Ultra-fast response time. The color correction feature is perfectly suited for use with Cobalt OGCP-9000/CC Remote Control Panel.

FRAME SYNC (+FS)

Adds frame sync to card. Offers unsurpassed accuracy in audio-video delay (lip sync) management, with glitch-free per-channel audio delay adjustment.

DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENC DVS)

Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus™ encoding. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information

FRAME BUFFER EXPANSION (+MEM)

Increases the independently adjustable audio and video delay buffer capacity to 47 seconds for SD video, 8 seconds for HD video, or 4 seconds for 3G video. (+MEM is a hardware-based option and is not available as a field upgrade. This option is displayed as "+2GB" on the DashBoard card info pane.)

» AUDIO OPTIONS

LINEAR ACOUSTIC® LOUDNESS PROCESSING (+LP51/+LP20)*

Featuring Linear Acoustic® AEROMAX® technology and available in 5.1-channel (LP51) and stereo (LP20) configurations. These loudness processors use inputs from any source received by the card, or any mixing setting produced by the card. AEROMAX® algorithms use a sophisticated multi-band approach to loudness processing, and can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible.

Up to two 5.1 loudness processors can be ordered per card, order as +LP51A and +LP51B. Up to four stereo loudness processors can be ordered per card, order as +LP20A, +LP20B, +LP20C and +LP20D.

LINEAR ACOUSTIC® AUTOMATIC UPMIXER (+UM)*

Featuring Linear Acoustic® UPMAX™ technology, upmixing allows legacy stereo program content to be converted to full 5.1-channel audio. UPMAX™ mode detects 2.0 content and automatically applies upmix mode (with configurable switchover fade-in/fade-out) depending on absence or presence of 5.1 source audio.

Up to two upmixers may be configured on the card, order as +UMA and +UMB.

SOFTWARE LOUDNESS METER (+LM-C)

Cobalt's +LM audio loudness metering option (in conjunction with a Cobalt OGCP-9000 Remote Control Panel with +LM-P option) provides a flexible solution for ingest or on-air loudness metering and assessment in compliance with ITU/ATSC/EBU standards. Easy to use, the +LM offers "true peak" level detection, error tracking and logging, and intuitive interface with touch screen control.

AUDIO FAILOVER (+AFO)

Provides automatic failover to alternate ("secondary") channels to substitute for the primary channels in the event of audio signal loss.

AUTO DOWNMIX (+ADM)

Provides automatic Stereo downmix from selected alternate multi-channel sources if primary Stereo channels lose signal.

DOLBY® DIGITAL/DIGITAL PLUS™ ENCODING (+ENC D)

Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card. Up to four independent encoders - all on the same card - can be included (+ENCDA thru +ENCDD). This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

DOLBY® E/DIGITAL/DIGITAL PLUS™ DECODING (+DEC)

Decodes Dolby® E, Digital, and Digital Plus™ signals from AES or embedded sources. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

DOLBY® E ENCODING (+ENCE)

Provides Dolby® E encoding from any combination of audio sources supported by the card. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

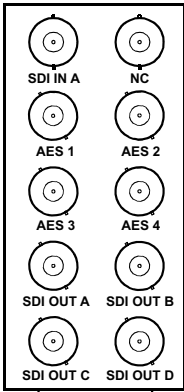
DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENC DVS)

Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus™ encoding. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

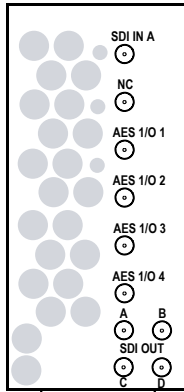
*The following Processing/Upmixing combinations, and their subsets, are available. Contact sales for more information.

- Upmixer, 5.1 Processor, Aux Stereo Processor (+UMA, +LP51A, +LP20A)
- Two stereo processors, two upmixers (+LP20A, +LP20B, +UMA, +UMB)
- Two 5.1 loudness processors (+LP51A, +LP51B)
- Four stereo loudness processors (+LP20A, +LP20B, +LP20C, +LP20D)

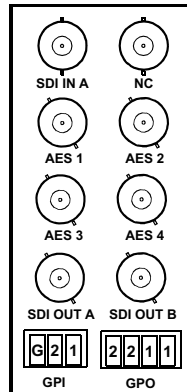
9931-EMDE



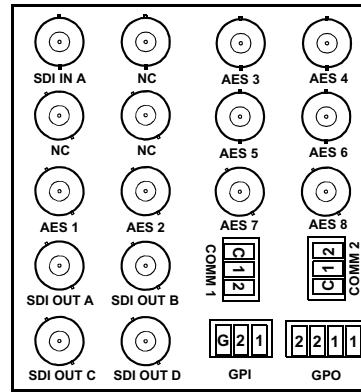
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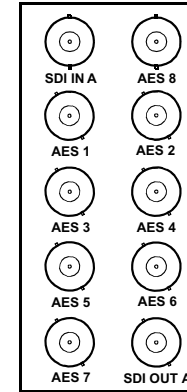
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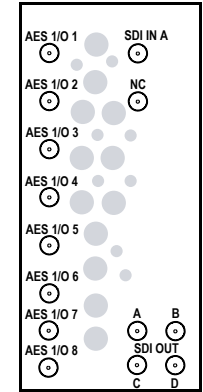
RM20-9931-D



RM20-9931-E

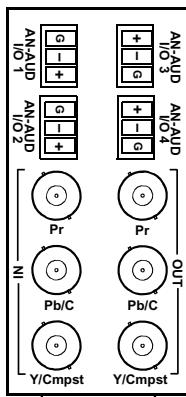


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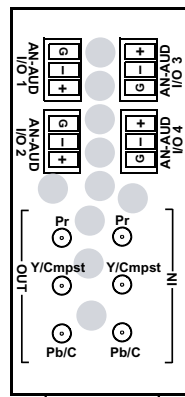


RM20-9931-F-HV

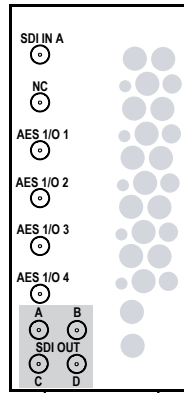
EXPANSION REAR I/O MODULES



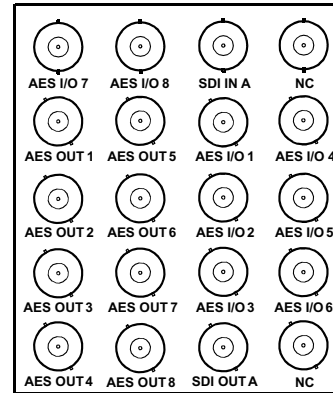
RM20-9931-XB



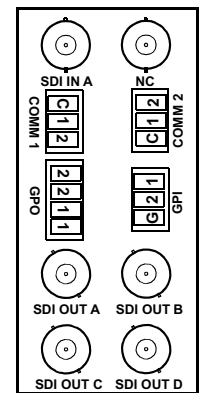
RM20-9931-XB-HV



RM20-9931-F-HV2

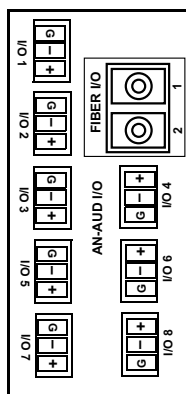


RM20-9931-G

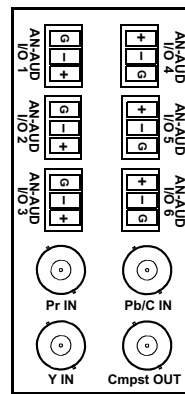


RM20-9931-H

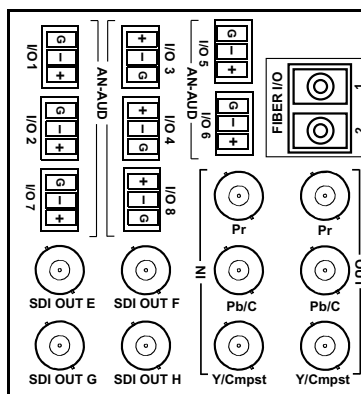
Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an “X” in the part number and must be used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 3)



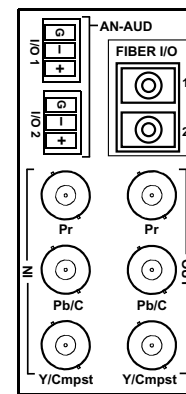
RM20-9931-XC



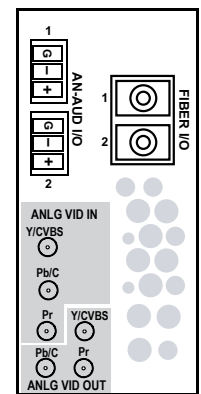
RM20-9931-XD



RM20-9931-XE



RM20-9931-XF



RM20-9931-XF-HV

9931-EMDE

)) ORDERING INFORMATION

9931-EMDE 3G/HD/SD-SDI Embedder/De-Embedder

9931-DE 3G/HD/SD-SDI De-Embedder

9931-EM 3G/HD/SD-SDI Embedder

BASE REAR I/O MODULES

Base Rear I/O Modules provide connections for standard card BNC video and audio connections, as well as other connections depending on rear module part number. These modules mate directly with the Fusion3G® card.

RM20-9931-B 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 4 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9931-B-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 1 3G/HD/SD-SDI Input, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9931-B-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 1 3G/HD/SD-SDI Input, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9931-D 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 4 AES I/O BNCs, 2 GPIO, 2 3G/HD/SD-SDI Outputs

RM20-9931-E 20-Slot Frame Rear I/O Module (Double Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI Outputs

RM20-9931-F 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 1 3G/HD/SD-SDI Output

RM20-9931-F-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 1 3G/HD/SD-SDI Input, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9931-F-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 1 3G/HD/SD-SDI Input, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9931-F-HV2-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors DIN 1.0.2.3)

RM20-9931-F-HV2-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors HD-BNC)

RM20-9931-G 20-Slot Frame Rear I/O Module (Double Width) 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 8 additional AES Outputs, 3G/HD/SD-SDI Output (Available only in conjunction with card option +AES16)

RM20-9931-H 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI BNC Input, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI BNC Outputs

EXPANSION REAR I/O MODULES

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 3)

RM20-9931-XB 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9931-XB-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9931-XB-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9931-XC 20-Slot Frame Rear I/O Module (Standard Width) 2 Fiber I/O, 8 Analog Audio I/O

RM20-9931-XD 20-Slot Frame Rear I/O Module (Standard Width) Component In, 6 Analog Audio I/O, Composite Out

RM20-9931-XE 20-Slot Frame Rear I/O Module (Double Width) Component In, 2 Fiber I/O, 8 Analog Audio I/O, Component Out, 4 3G/HD/SD-SDI Outputs

RM20-9931-XF 20-Slot Frame Rear I/O Module (Standard Width) Component In, 2 Fiber I/O, 2 Analog Audio I/O, Component Out

RM20-9931-XF-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are DIN1.0/2.3) This Rear I/O Module must be used with an HV Base Rear I/O Module.

RM20-9931-XF-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are HD-BNC) This Rear I/O Module must be used with an HV Base Rear I/O Module.

9950-EMDE-ANC » ANCILLARY DATA EMBEDDER/DE-EMBEDDER

New for 2014, the 9950-EMDE-ANC Ancillary Data Embedder/De-Embedder offers full VANC/HANC ancillary data de-embedding and embedding for 3G/HD/SD-SDI streams. The easy to use interface allows direct access to DID and SDID locations to extract or insert user data such as camera PTZ, SCTE 104, closed-captioning read/insert, GPI/GPO via ANC, or other specialized user payloads.

Data insertion and extraction is via serial or IP interfaces. Easy to use DashBoard control provides for easy setup and configuration. The openGear® card-based form-factor and high-density design allows up to 20, 9950-EMDE-ANC cards to be fitted to a 20-slot frame. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

» FEATURES

Full insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, GPI/GPO via ANC, and other specialized user payloads

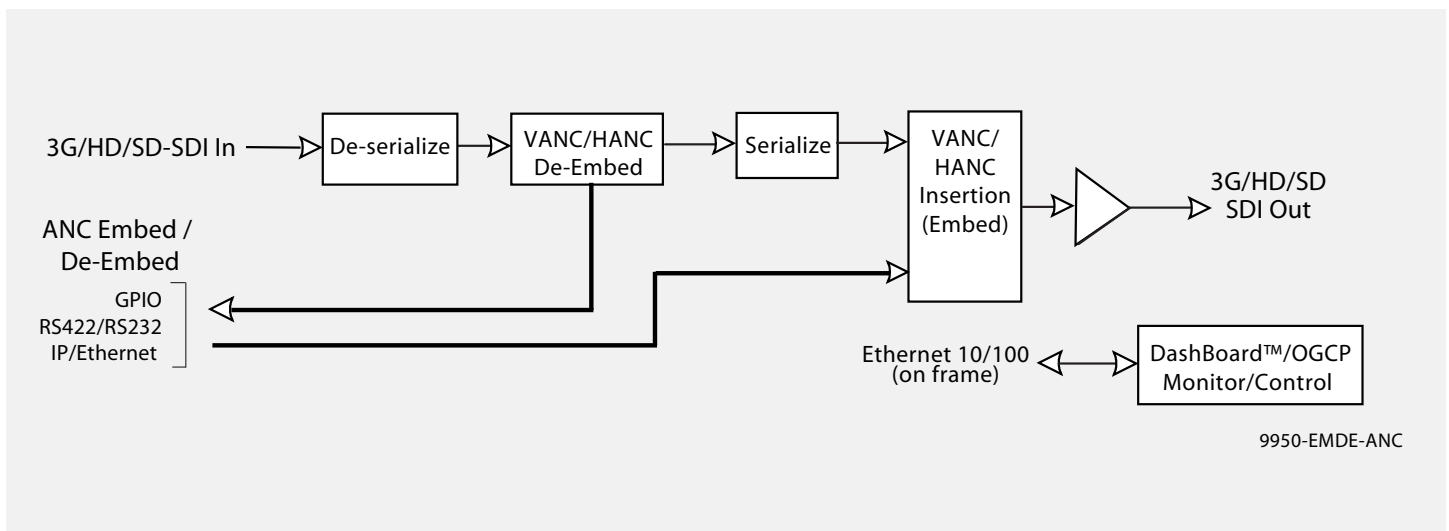
Full user VANC/HANC access

Low latency pass-thru for all 3G/HD/SD-SDI payloads

openGear® card-based form factor provides easy, compact, and economical integration

DashBoard™ remote control status monitoring and setup/control

Five year warranty



» SPECIFICATIONS

Power

<18 Watts

SDI Input/Output

Number of Inputs: (1) 3G/HD/SD-SDI 75Ω BNC
 Number of Outputs: (1) 3G/HD/SD-SDI 75Ω BNC
 Standards: SMPTE 259M, 292M, 424M
 Return Loss: 15 dB up to 1.485 GHz, 10 dB up to 2.970 GHz
 SDI Signal Level: 800 mV nominal
 SDI Return Loss: >15 dB up to 1.485 GHz, >10 dB up to 2.970 GHz

Supported Formats:

1080p59.94,50,29.97, 25, 24, 23.98, 1080i59.94,50, 625i50, 525i59.94

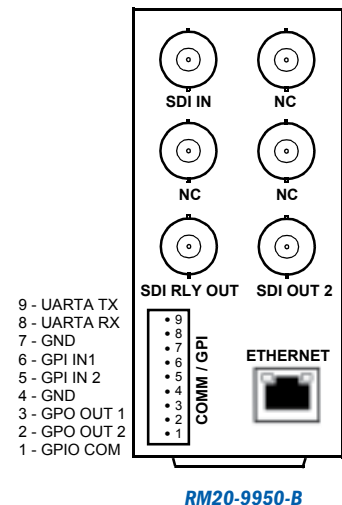
Reference Video Input

Number of Inputs: 2 (openGear® frame)
 Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

» ORDERING INFORMATION

9950-EMDE-ANC Ancillary Data Embedder/De-Embedder

RM20-9950-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) Serial I/O Port, (1) GPIO port, (1) 10/100/1000 Ethernet Data I/O Port



9932-EMDE » 3G/HD/SD-SDI 16-PAIR (32-CH) EMBEDDER/DE-EMBEDDER

with Audio/Video Processing and CVBS I/O



The all-new Cobalt® 9932-EMDE 3G/HD/SD-SDI 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O provides a full-feature embedder/de-embedder with up to 32 channels of simultaneous AES embedding/de-embedding. The 9923-EMDE is available with numerous options that expand its function well beyond embed/de-embed to maximize frame processing density and system economy.

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair. Bulk and per-channel audio delay controls easily address lip-sync issues.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. Quality Check option +QC allows failover to alternate inputs based on user-configurable criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS marker. A moving-box insertion can be enabled

to serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video. The 9923-EMDE also provides analog CVBS video inputs and outputs, and analog audio embedding and de-embedding. With option +ANC, the 9923-EMDE offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. Full user Dashboard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Multi-input, with manual selection or intelligent Auto-Changeover failover

Closed-captioning absence detection and flagging, with GPO, automated alert email, go-to user preset, or other actions

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides failover on criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static

Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

CVBS analog video I/O and analog/AES embed / de-embed available

Option +ANC adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads.

Video options include color correction and keying

Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty

OPTIONS

Quality Check (+QC). Provides failover on subjective criteria such as black/frozen frame or audio silence.

Key/Fill Keyer (+KEYER). Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

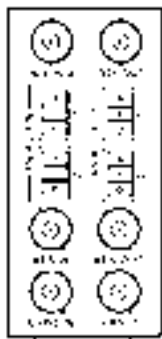
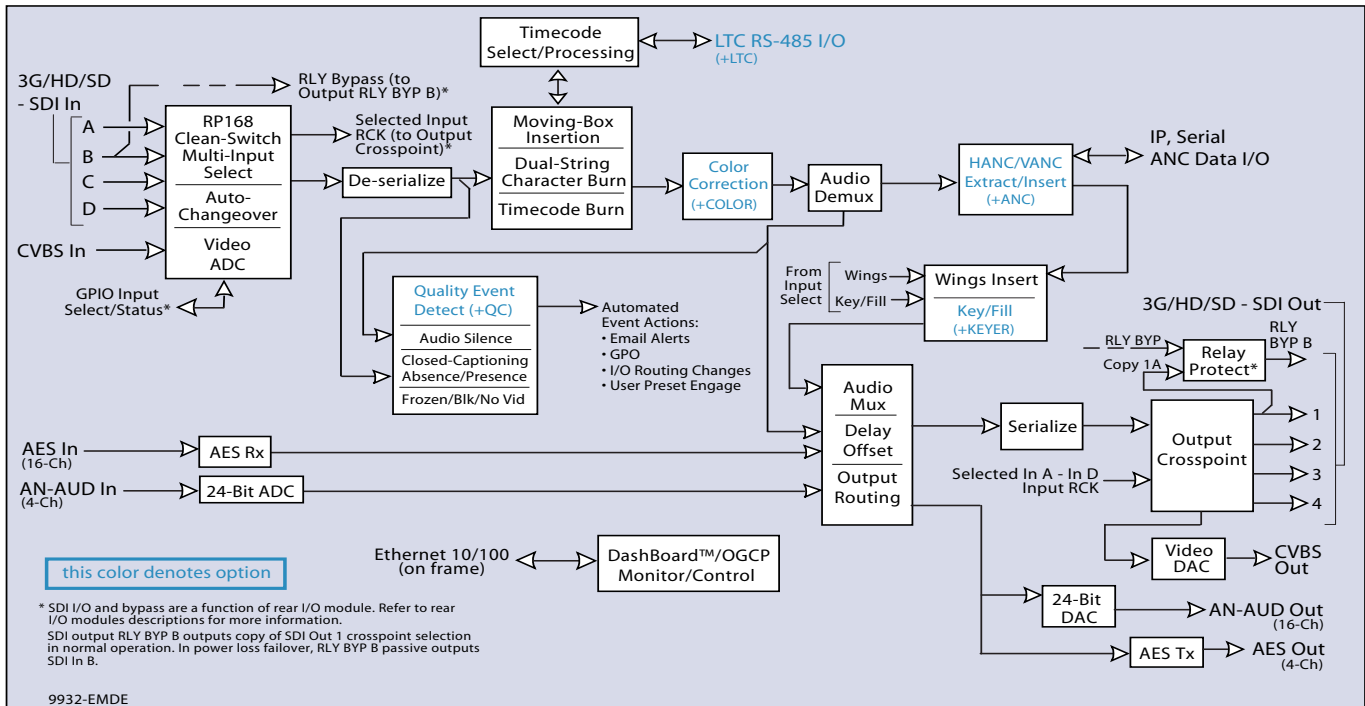
Audio LTC I/O (+LTC)

Color Correction (+COLOR). Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

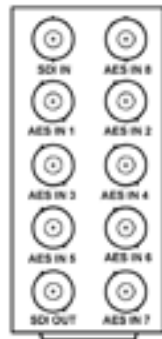
Ancillary Data Processor (+ANC). Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces.

openGear

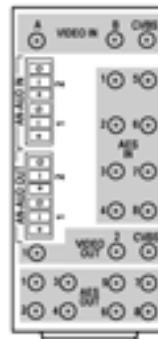
9932-EMDE



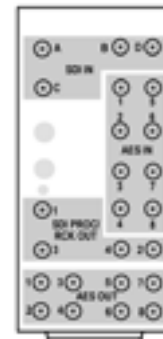
RM20-9932-FS-B



RM20-9932-FS-C



RM20-9932-D-DIN
RM20-9932-D-HDBNC



RM20-9932-E-DIN
RM20-9932-E-HDBNC

Rear Module complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new rear module models.



9932-EMDE

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input

(1) 75Ω BNC output. CVBS output functional only when selected processed signal is carrying SD-SDI.

ADC resolution: 9-bit

Sampling frequency: 27 MHz (2x over-sampling)

Y/C separation: 4 line Adaptive Comb Filter

Freq. Response: ± 0.25 dB to 5.5 MHz

SNR: > 50 dB to 5.5 MHz (unweighted)

Differential Phase: < 1 degree

Differential Gain: < 1%

Nonlinearity < 1%

Discrete Audio Input/Outputs

AES-3id 75? inputs (8 pair (16-Ch) max)

AES-3id 75? outputs (8 pair (16-Ch) max)

Input AES SRC Range: 32 to 96 kHz

Balanced analog audio inputs (4-Ch max)

Balanced analog audio outputs (4-Ch max)

(I/O conforms to 0 dBFS = +24 dBu)

Analog Output Impedance: < 50 Ω

Analog Reference Level: -20 dBFS

Analog Nominal Level: +4 dBu

Analog Max Output Level: +24 dBu (0 dBFS)

Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

Analog SNR: 115 dB (A weighted)

Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)

Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Input Select/Auto-Changeover Failover

Manual selection (forced) of any input.

- Failover to alternate input on loss of target input. Failover invoked upon LOS and/or (with option +QC) user configurable parametric criteria such as black/frozen frame or audio silence.

- Black frame trigger configurable for black intensity threshold and persistence time.

- Frozen frame trigger configurable for frozen percentage difference and persistence time.

- Audio silence trigger configurable for dBFS floor threshold and persistence time.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

9932-EMDE

ORDERING INFORMATION

9932-EMDE 3G/HD/SD-SDI 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O

RM20-9932-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video Input BNC, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (1) AES Output BNC

RM20-9932-C 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) AES Input BNCs, (1) 3G/HD/SD-SDI Output BNC

RM20-9932-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9932-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9932-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9932-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC.)

+QC Quality Check Option

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+ANC Ancillary Data Processor

9933-DE8-AA » 3G/H D/SD-SDI 8-CHANNEL BALANCED ANALOG AUDIO DE-EMBEDDER



The all-new Cobalt® 9933-DE8-AA 3G/H D/SD-SDI 8-Channel Balanced Analog Audio De-Embedder offers balanced audio de-embedding in a basic, economical, high-efficiency openGear® card. The 9933-DE8-AA provides de-embedding of professional balanced audio at 0 dBFS to pro 24 dBu levels using full 24-bit conversion.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user Dashboard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Eight balanced analog audio outputs with user-selectable flexible de-embedding from groups 1 thru 4

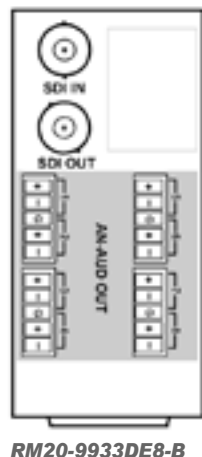
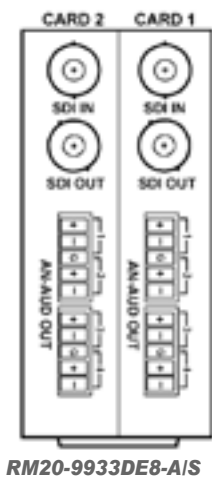
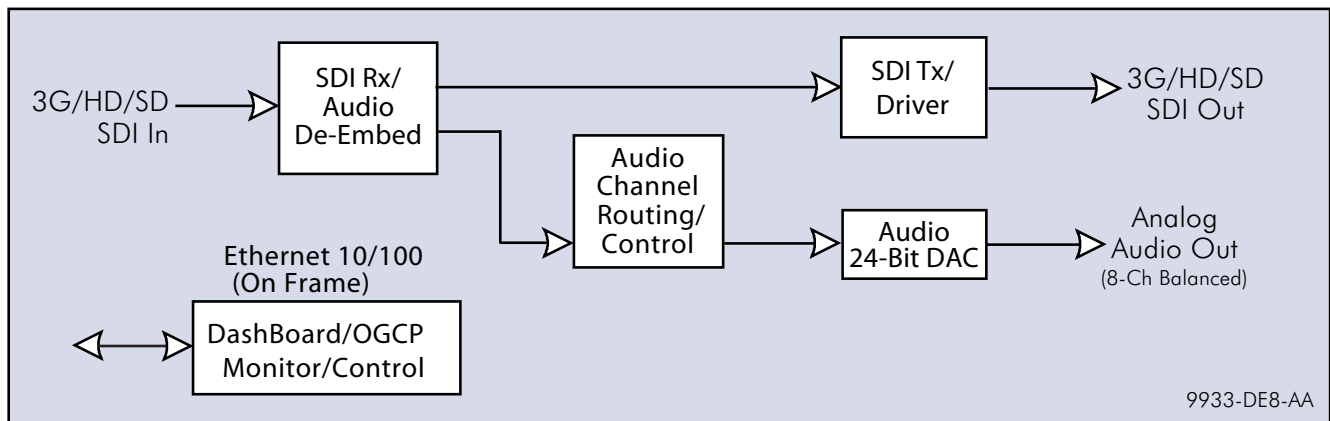
Dashboard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

Balanced audio de-embed with full 0 dBFS-to-24 dBu 24-bit conversion

Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty



9933-DE8-AA

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Inputs/Outputs

(1) 75Ω BNC inputs

(1) 75Ω BNC output

SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio conversion Format

48 kHz sampling, 24-bit. Supports inputs up to 0 dBFS to 24 dBu

Analog Audio Outputs

(8) Balanced analog audio outputs (max)

I/O conforms to 0 dBFS = +24 dBu

Output Impedance: < 50 Ω

Reference Level: -20 dBFS

Nominal Level: +4 dBu

Max Output Level: +24 dBu (0 dBFS)

Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

SNR: 115 dB (A weighted)

THD+N: -96 dB (20 Hz to 10 kHz)

Crosstalk: -106 dB (20 Hz to 20 kHz)

ORDERING INFORMATION

9933-DE8-AA 3G/HD/SD-SDI 8-Channel Balanced Analog Audio De-Embedder

RM20-9933DE8-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) 3G/HD/SD-SDI Input BNC, (4) Balanced Analog Audio Outputs, (1) 3G/HD/SD-SDI Output BNC (connections are per card)

RM20-9933DE8-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) Balanced Analog Audio Outputs, (1) 3G/HD/SD-SDI Output BNC

9933-EM8-AA » 3G/HD/SD-SDI 8-CHANNEL BALANCED ANALOG AUDIO EMBEDDER



The all-new Cobalt® 9933-EM8-AA 3G/HD/SD-SDI 8-Channel Balanced Analog Audio Embedder offers balanced audio embedding in a basic, economical, high-efficiency openGear® card. The 9933-EM8-AA provides embedding from professional balanced audio 24 dBu levels to 0 dBFS to using full 24-bit conversion.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user Dashboard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Eight balanced analog audio inputs with user-selectable flexible embedding to groups 1 thru 4

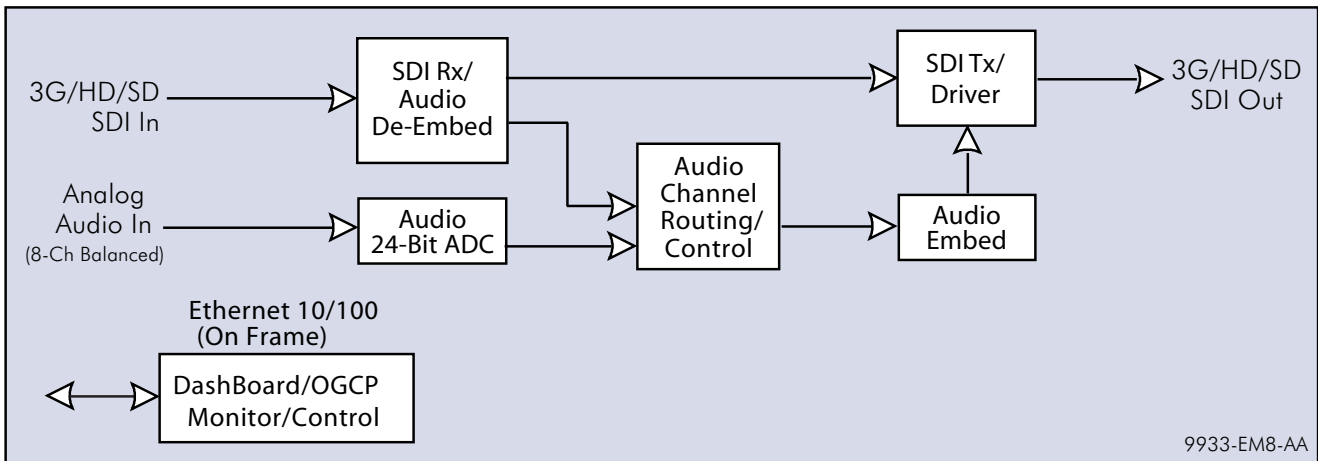
DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

Balanced audio embed with full 24 dBu-to-0 dBFS 24-bit conversion

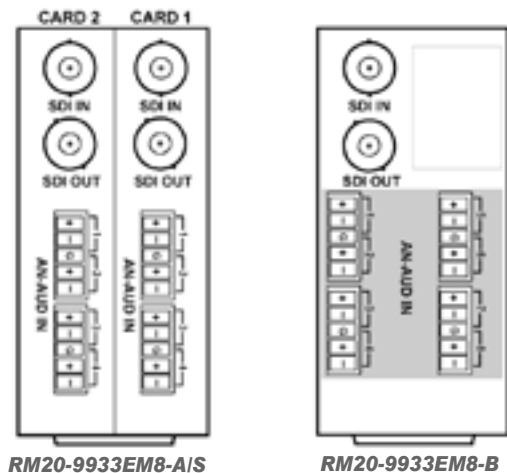
Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty



9933-EM8-AA



9933-EM8-AA

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Inputs/Outputs

(1) 75Ω BNC inputs

(1) 75Ω BNC output

SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio conversion Format

48 kHz sampling, 24-bit. Supports inputs up to 24 dBu

Analog Audio Inputs

(8) Balanced analog audio inputs (max)

I/O conforms to +24 dBu = 0 dBFS

Input Impedance: >10 kΩ

Reference Level: -20 dBFS

Nominal Level: +4 dBu

Input Clip Level: +24 dBu (0 dBFS)

Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

SNR: 115 dB (A weighted)

THD+N: -96 dB (20 Hz to 10 kHz)

Crosstalk: -106 dB (20 Hz to 20 kHz)

ORDERING INFORMATION

9933-EM8-AA 3G/HD/SD-SDI 8-Channel Balanced Analog Audio Embedder

RM20-9933EM8-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) 3G/HD/SD-SDI Input BNC, (4) Balanced Analog Audio Inputs, (1) 3G/HD/SD-SDI Output BNC (connections are per card)

RM20-9933EM8-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) Balanced Analog Audio Inputs, (1) 3G/HD/SD-SDI Output BNC

9933-EMDE8-AES110 » 3G/HD/SD-SDI 8-PAIR (16-CH) BALANCED AES AUDIO EMBEDDER/DE-EMBEDDER



The all-new Cobalt® 9933-EMDE-8-AES110 3G/HD/SD-SDI 8-Pair (16-Ch) Balanced AES Audio Embedder / De-Embedder offers balanced AES (AES/EBU) embedding/de-embedding in a basic, economical, high-efficiency openGear® card.

The 9933-EMDE8-AES110 provides full 16-channel embed and de-embed between AES and all four groups of embedded audio. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

8-pair (16-channel) balanced AES support. Individual per-pair embedding or de-embedding in a basic, economical package.

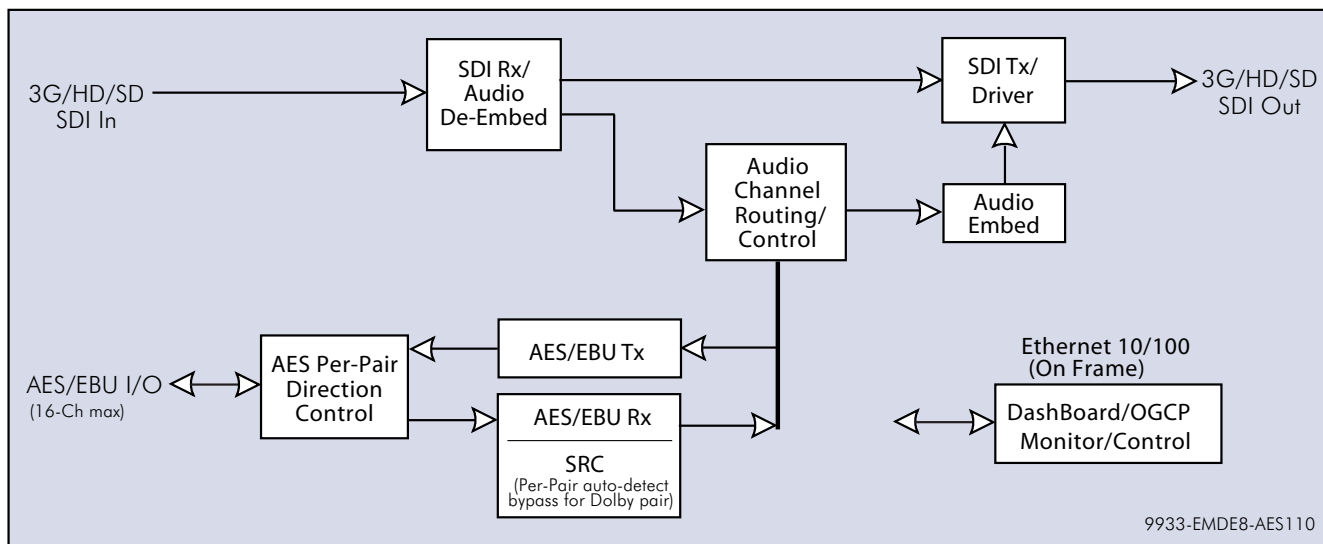
DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panels

Five year warranty



9933-EMDE8-AES110

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<18 Watts

SDI Inputs/Outputs

SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs.

AES Audio Input/Output

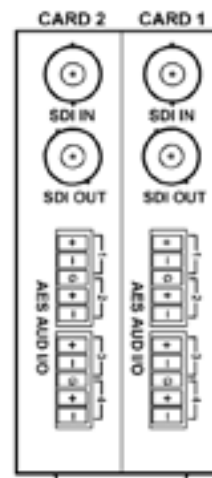
(8) Balanced AES/EBU audio input/outputs (AES/EBU) with per-pair port direction controls

ORDERING INFORMATION

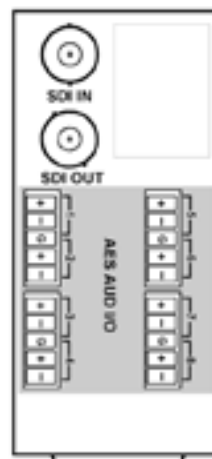
9933-EMDE8-AES110 3G/HD/SD-SDI 8-Pair (16-Ch) Balanced AES Audio Embedder / De-Embedder

RM20-9933AES110-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) 3G/HD/SD-SDI Input BNC, (4) Balanced AES Audio I/O, (1) 3G/HD/SD-SDI Output BNC (connections are per card)

RM20-9933AES110-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) Balanced AES Audio I/O, (1) 3G/HD/SD-SDI Output BNC



RM20-9933AES110-AIS



RM20-9933AES110-B

9933-EMDE16-AES75 » 3G/HD/SD-SDI 16-PAIR (32-CH) UNBALANCED AES AUDIO EMBEDDER/DE-EMBEDDER



The all-new Cobalt® 9933-EMDE16-AES75 3G/HD/SD-SDI 16-Pair (32-Ch) Unbalanced AES Audio Embedder / De-Embedder offers unbalanced AES (AES-3id) embedding/de-embedding in a basic, economical, high-efficiency openGear® card. While a basic embedder/de-embedder, the 9933-EMDE16-AES75 is big on capacity, with up to 32 channels of simultaneous embedding/de-embedding.

The 9933-EMDE16-AES75 provides full 32-channel embed and de-embed between AES and all four groups of embedded audio. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

16-pair (32-channel) coaxial AES support. Individual per-pair embedding or de-embedding.

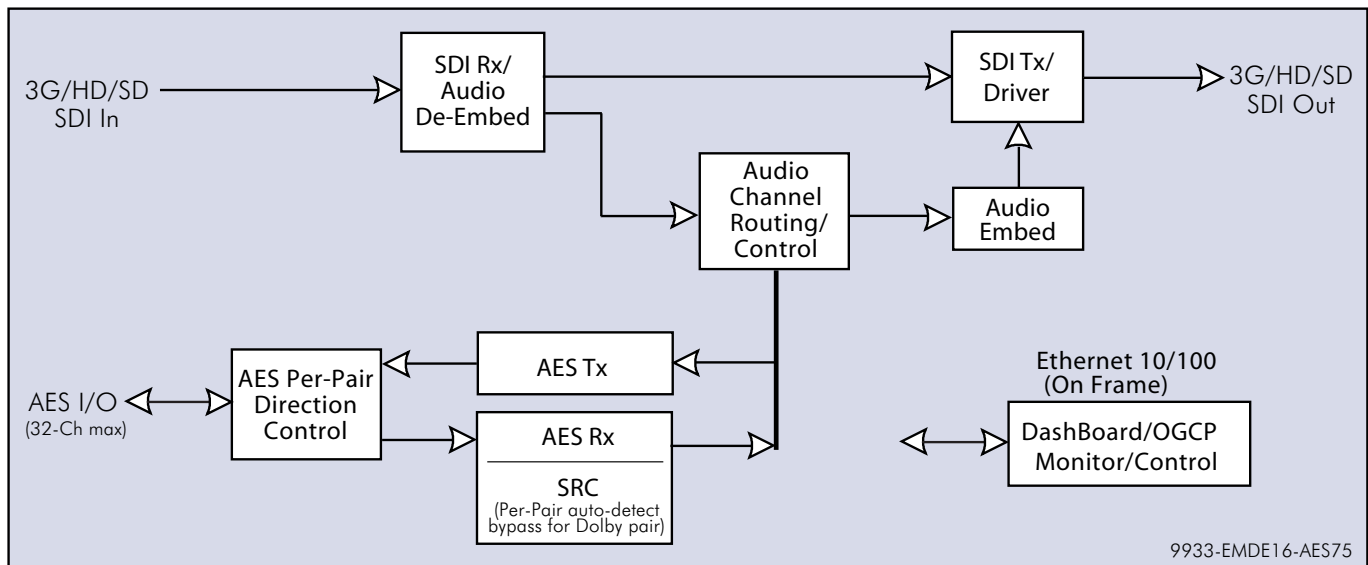
DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty



9933-EMDE16-AES75



9933-EMDE16-AES75

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Inputs/Outputs

SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs.

AES Audio Input/Output

(16 max) Unbalanced AES audio input/outputs (AES-3id) with per-pair port direction controls

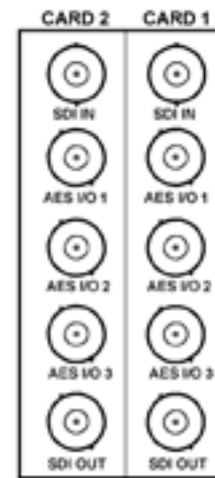
ORDERING INFORMATION

9933-EMDE16-AES75 3G/HD/SD-SDI 16-Pair (32-Ch) Unbalanced AES Audio Embedder / De-Embedder

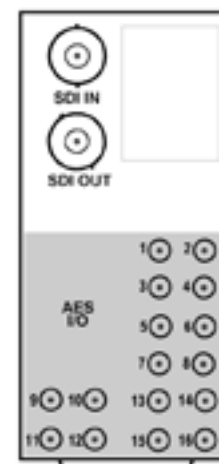
RM20-9933AES75-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) 3G/HD/SD-SDI Input BNC, (3) AES Audio I/O BNCs, (1) 3G/HD/SD-SDI Output BNC (connections are per card)

RM20-9933AES75-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (16) Coaxial AES Audio I/O (DIN 1.0/2.3)

RM20-9933AES75-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (16) Coaxial AES Audio I/O (HD-BNC)



RM20-9933AES75-AIS



RM20-9933AES75-B-DIN
RM20-9933AES75-B-HDBNC

9933-EMDE16-AES75

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Inputs/Outputs

SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs.

AES Audio Input/Output

(16 max) Unbalanced AES audio input/outputs (AES-3id) with per-pair port direction controls

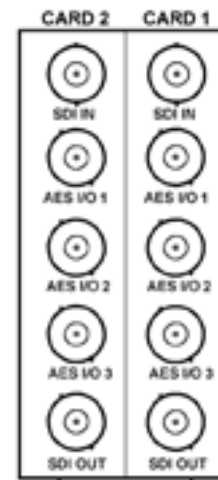
ORDERING INFORMATION

9933-EMDE16-AES75 3G/HD/SD-SDI 16-Pair (32-Ch) Unbalanced AES Audio Embedder / De-Embedder

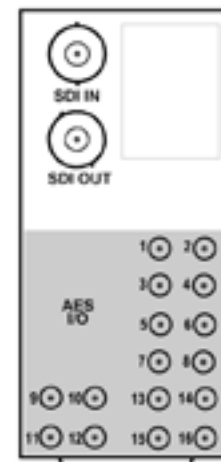
RM20-9933AES75-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (1) 3G/HD/SD-SDI Input BNC, (3) AES Audio I/O BNCs, (1) 3G/HD/SD-SDI Output BNC (connections are per card)

RM20-9933AES75-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (16) Coaxial AES Audio I/O (DIN 1.0/2.3)

RM20-9933AES75-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (16) Coaxial AES Audio I/O (HD-BNC)



RM20-9933AES75-AIS



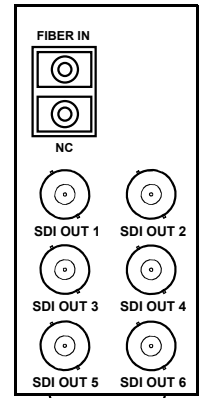
RM20-9933AES75-B-DIN
RM20-9933AES75-B-HDBNC

9211-OE » 3G/HD/SD-SDI FIBER RECEIVER

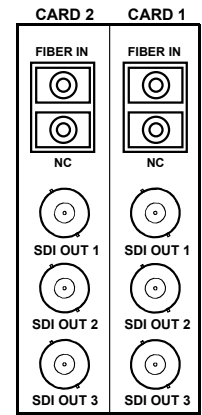


The 9211-OE is a 3G/HD/SD-SDI fiber receiver card, and converts a fiber optic signal to an SDI signal. The 9211-OE detects the incoming fiber signal and outputs the SDI signal over six BNC connectors. Card-edge LED indicators identify the presence of incoming video and the identified signal data rate.

The 9211-OE can operate as a 1x6 (one in, six out) BNC DA using a full rear module (RM20-9211-B), or operate as an independent 1x3 BNC DA using the split rear module (RM20-9211-B/S). In the 1x3 configuration, the outputs are non-inverting, making it an excellent ASI distribution amplifier.



RM20-9211-B



RM20-9211-B/S

» FEATURES

Conforms to SMPTE 424M, SMPTE 292M, and SMPTE 259M

LC/UPC optical connection

LED indicators for signal presence and data rate

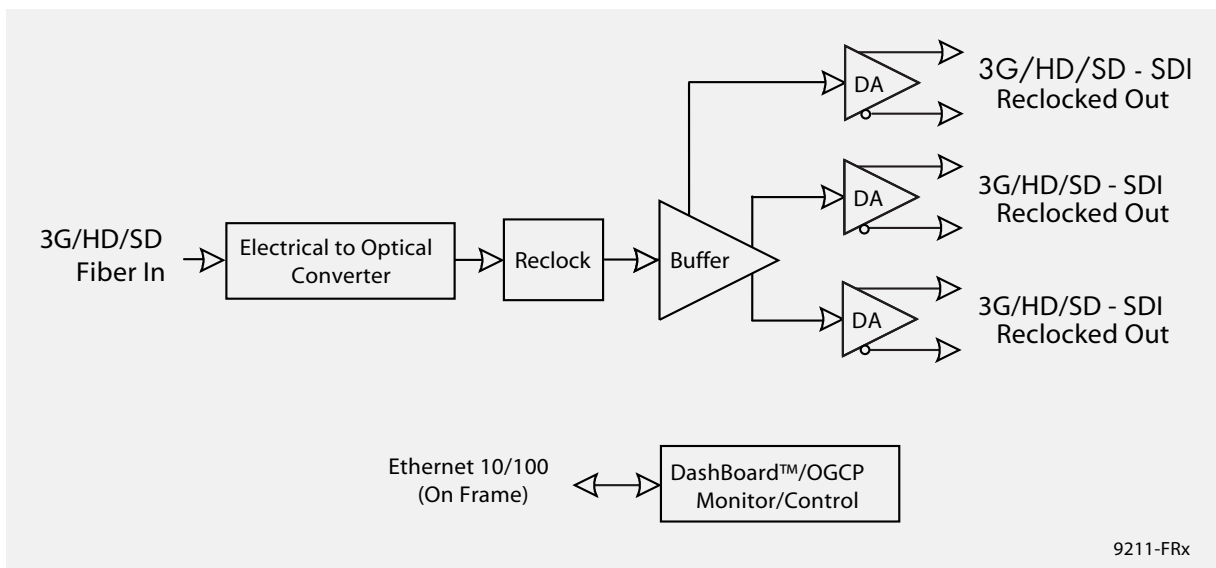
Remote monitoring via Dashboard™ software or OGCP-9000 control panel

Reclocking at 270 Mbps, 1.483 Gbps, 1.485 Gbps, and 2.970 Gbps

Automatic detection of incoming data rate

High density with 20 cards per 20-Slot frame using split rear modules

Five-year warranty



9211-FRx

» SPECIFICATIONS

Electrical

Power: 4 watts

Optical Input

Number of Inputs: 1
 Standard: 143-360 Mbps SMPTE 259
 1.485 Gbps - SMPTE 292
 3 Gbps - SMPTE 424M
 Operating Wavelength Range: 1210 nm to 1600 nm
 Connector Type: Single Mode, LC/UPC

SDI Outputs

Number of Outputs: Full Rear Module: 6
 Split Rear Module: 3
 Return Loss: >15 dB to 1.485 GHz
 >10 dB from 1.485 GHz to 2.97 GHz
 Connector Type: BNC

» ORDERING INFORMATION

9211-OE 3G/HD/SD-SDI Fiber Receiver Card

RM20-9211-B 20-Slot Frame Rear I/O Module (Standard Width) with 1 Optical LC Input, 6 Reclocked Output BNCs

RM20-9211-B/S 20-Slot Frame Rear I/O Module (Split) 1 Optical LC Input, 3 Reclocked Output BNCs (per card)



9212-E0 » 3G/H/SD-SDI FIBER TRANSMITTER



The 9212-E0 is a 3G/H/SD-SDI fiber transmitter (E0) card. The card converts an SDI signal to a fiber optic link, allowing for longer transport distances. The 9212-E0 also equalizes the incoming SDI signal, and then reclocks the signal with automatic rate detection for all popular data rates. Card-edge LED indicators identify the presence of incoming video and the identified signal data rate. With full 3G/H/SDI support of both fiber and coax, the 9212-E0 is the ideal universal SDI distribution amplifier.

The 9212-E0 can operate as a 1x5 (one in, five out) BNC DA with fiber output using a full rear module (RM20-9212-B) or as an independent 1x2 BNC DA with fiber output using the split rear module (RM20-9212-B/S). In the 1x2 configuration, the outputs are non-inverting making it an excellent ASI distribution amplifier. Using the split rear module, up to 20 9212-FTx cards can be used in a frame.

» FEATURES

Conforms to SMPTE 424M, SMPTE 292M, and SMPTE 259M

Reclocking at 270 Mbps, 1.483 Gbps, 1.485 Gbps, and 2.970 Gbps

LC/UPC optical connection

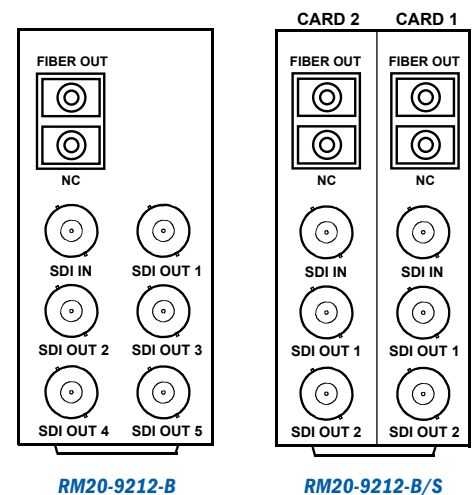
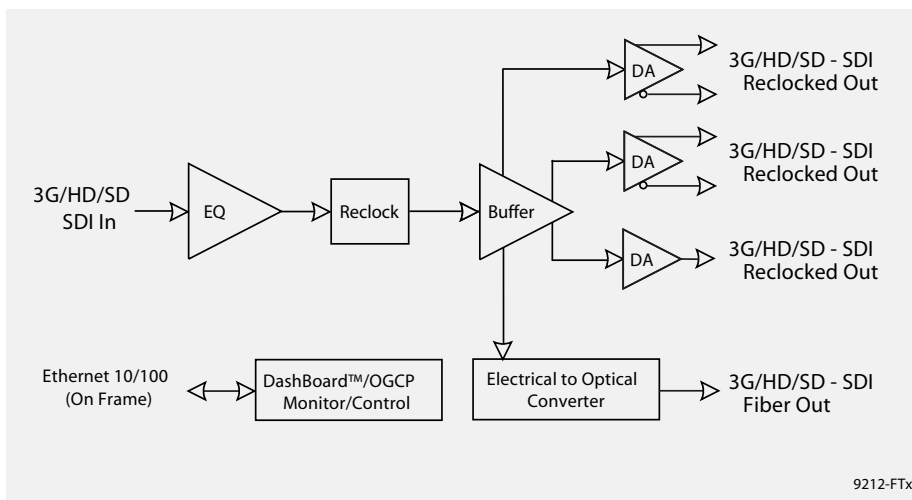
Automatic detection of incoming data rate

LED indicators for signal presence and data rate

High-density with 20 cards per 20-Slot frame using split rear modules

Remote monitoring via Dashboard™ software or OGCP-9000 control panel

Five-year warranty



» SPECIFICATIONS

Electrical

Power: 4 watts

Optical Input

Number of Inputs: 1
 Standard: 143-360 Mbps - SMPTE 259M
 1.485 Gbps - SMPTE 292
 3 Gbps - SMPTE 424M
 Operating Wavelength Range: 1210 nm to 1600 nm

SDI Outputs

Number of Outputs: Full Rear Module: 5 SDI BNC;
 1 Fiber Split Rear Module:
 2 SDI BNC; 1 Fiber
 Return Loss: >15 dB to 1.485 GHz
 >10 dB from 1.485 GHz to 2.97 GHz
 Connector Type: BNC and Single Mode, LC/UPC

» ORDERING INFORMATION

9212-E0 3G/H/SD Fiber Transmitter Card

RM20-9212-B 20-Slot Frame Rear I/O Module (Standard Width) with 1 Optical LC Output, 5 Reclocked Copies of Input

RM20-9212-B/S 20-Slot Frame Rear I/O Module (Split) 1 BNC Input, 1 Optical LC Output, 2 Reclocked Input Copy BNCs (per card)



9213-20E » DUAL 3G/HD/SD-SDI FIBER RECEIVER

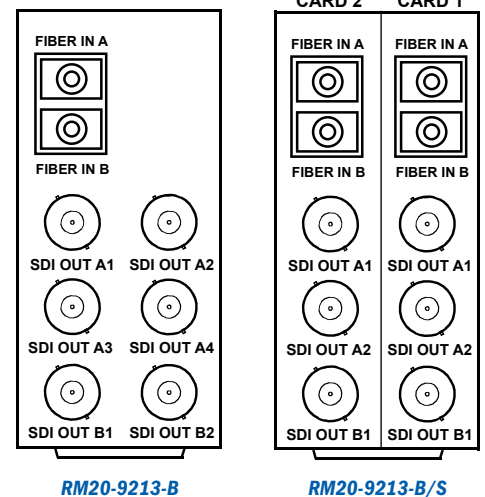
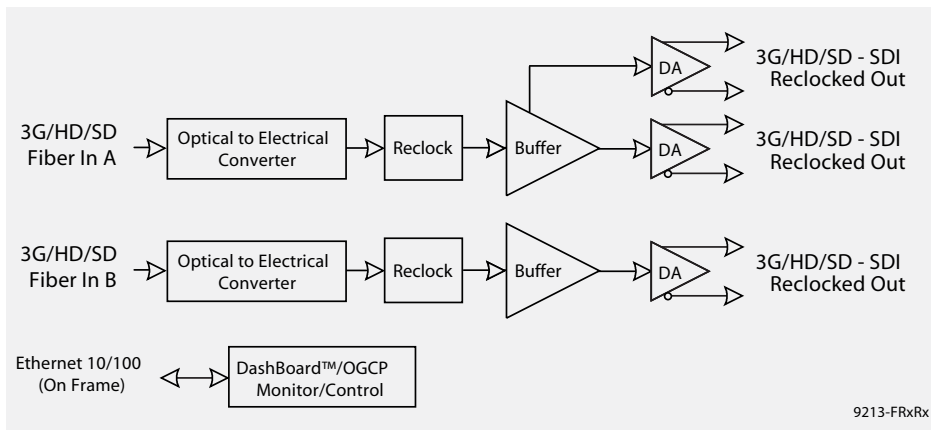


The 9213-20E is a dual 3G/HD/SD-SDI fiber receiver (OE) card. The card converts six fiber optic signals to independent SDI output signals. The 9213-20E detects the incoming fiber signal and outputs the up to six SDI signals over six BNC connectors. Card-edge LED indicators identify the presence of incoming video and the identified signal data rate.

The 9213-20E is fully hot swappable with all active components on the front removable module. No active components are installed on the rear module, greatly reducing down time and eliminating any need for users to access the back of the rack frame. Up to 20 cards can be used in the 20-Slot frame to achieve a density of 40 optical to electrical conversions in 2RU.

» FEATURES

Supports single-mode fiber	LC/UPC optical connection	LED indicators for signal presence and data rate	Five-year warranty
Reclocking at 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.967 Gbps, and 2.970 Gbps	Automatic detection of incoming data rate	Remote monitoring via Dashboard™ software or OGCP-9000 control panel	



» SPECIFICATIONS

Electrical Power: 5 watts	Optical Input Number of Inputs: 2 Standard: 143-360 Mbps - SMPTE 259M 1.485 Gbps - SMPTE 292 3 Gbps - SMPTE 424M Operating Wavelength Range: 1210 nm to 1600 nm Connector Type: Single Mode, LC/UPC	SDI Outputs Number of Outputs: Full Rear Module: 6 Split Rear Module: 3 Return Loss: >15 dB to 1.485 GHz >10 dB from 1.485 GHz to 2.97 GHz Connector Type: BNC
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» ORDERING INFORMATION

9213-20E Dual 3G/HD/SD Fiber Receiver Card	(Standard Width) with 2 Optical LC Inputs, 4 Reclocked Outputs of Input 1 and 2 Reclocked Outputs of Input 2	2 Optical LC Inputs, 2 Input A Reclocked Output BNCs, 1 Input B Reclocked Output BNC (per card)
RM20-9213-B 20-Slot Frame Rear I/O Module	RM20-9213-B/S 20-Slot Frame Rear I/O Module (Split)	



9214-2E0 » DUAL 3G/HD/SD-SDI FIBER TRANSMITTER

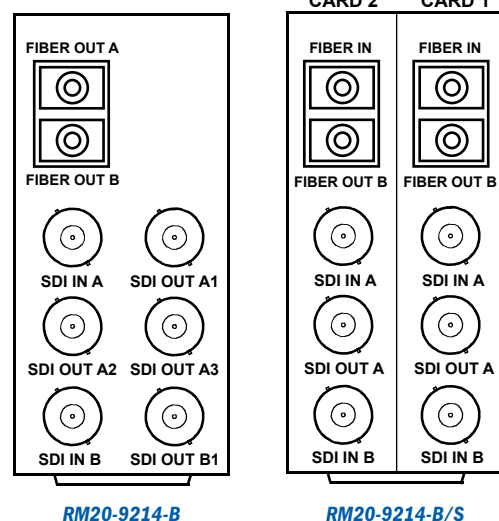
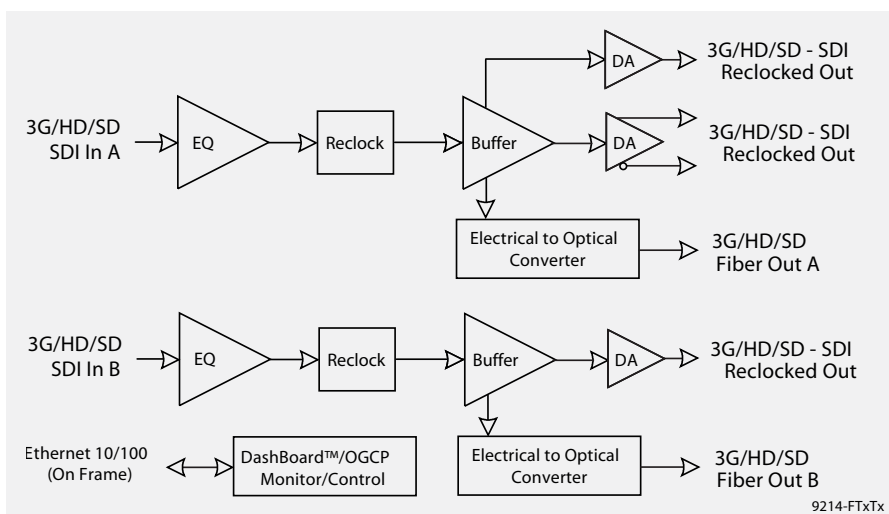


The 9214-2E0 is dual SDI to fiber optic transmitter card. The card converts two SDI signals to two fiber optic links, allowing for longer transport distances. Reclocked SDI outputs provide copies of each SDI input signal. The card supports serial digital data rates from 270 Mbps up to 2.98 Gbps (1080p). LED indicators at the front of the card identify the presence of incoming video and the identified signal data rates for each channel independently.

The 9214-2E0 is fully hot swappable with all active components on the front removable module. No active components are installed on the rear module, greatly reducing down time and eliminating any need for users to access the back of the rack frame. Each channel of the 9214-2E0 equalizes the incoming SDI signal and reclocks the signal with automatic rate detection for all popular data rates. Up to 20 cards can be used in the 20-Slot frame to achieve a density of 40 electrical to optical conversions in 2RU.

» FEATURES

Supports single-mode fiber	LC/UPC optical connection	LED indicators for signal presence and data rate	Remote monitoring via Dashboard™ software or OGCP-9000 control panel
Reclocking at 270 Mbps, 1.483 Gbps, 1.485 Gbps, 2.967 Gbps, and 2.970 Gbps	Automatic detection of incoming data rate		Five-year warranty



» SPECIFICATIONS

Electrical Power: 4 watts	Cable Lengths (w/Belden 1694A) 3 Gbps: 80 m 1.485 Gbps: 120 m 143-360 Mbps: 300 m	SDI Outputs Number of Outputs: 4 Full Rear Module: 4 Split Rear Module: 1 Return Loss: >15 dB (for SMPTE 259M) Connector Types: BNC and Single Mode LC/UPC Fiber
SDI Input Number of Inputs: 2 Standard: 143-360 Mbps - SMPTE 259M 1.485 Gbps - SMPTE 292 3 Gbps - SMPTE 424M		

» ORDERING INFORMATION

9214-2E0 Dual 3G/HD/SD Fiber Transmitter Card	(Standard Width) with 2 Optical LC Outputs, 3 Reclocked Copies of Input 1 and 1 Reclocked Output of Input 2	2 Input BNCs, 2 Optical LC Outputs, 1 Input A Reclocked Output BNC (per card)
RM20-9214-B 20-Slot Frame Rear I/O Module	RM20-9214-B/S 20-Slot Frame Rear I/O Module (Split)	



9215-E0-EM » AES/EBU FIBER AUDIO EMBEDDER

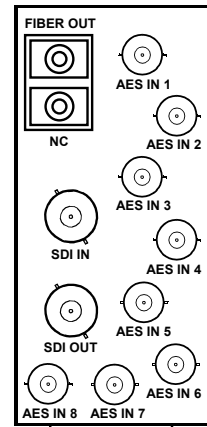
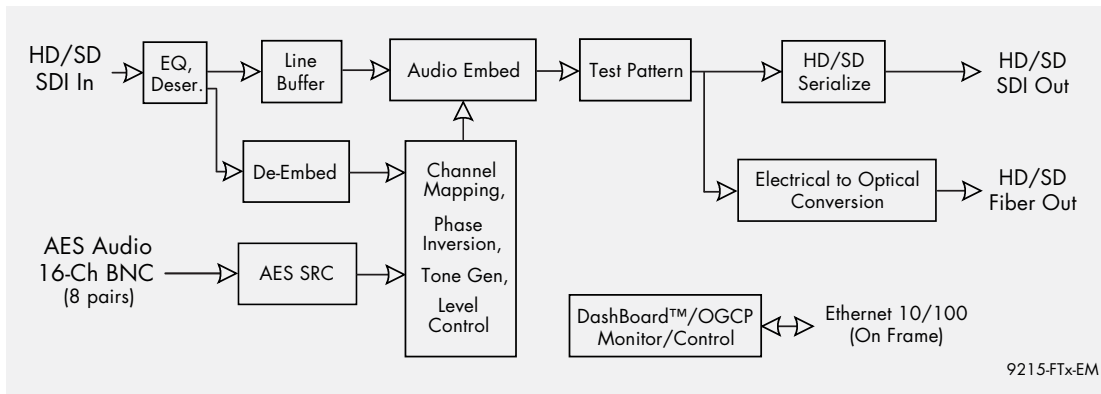


The 9215-E0-EM accepts an HD/SD-SDI BNC input along with up to 8 AES audio pairs, providing embedding and audio processing. The card provides SDI outputs on HD/SD-SDI BNC and fiber outputs.

The 9215-E0-EM offers full 24-bit audio processing/routing control (card edge and remote control) for individual channel gain, delay (up to one second), phase invert, as well as channel summing. Individual-channel SRC is also provided. User presets allow fast and easy recall of custom settings.

» FEATURES

Conforms to SMPTE 259M and SMPTE 292M	Audio delay user-adjustable up to one second	Automatic detection of incoming data rate	LED indicators for signal presence and data rate
LC/UPC optical connection	Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding	Remote monitoring via DashBoard™ software or OGCP-9000 control panel	Five-year warranty
Audio channel mapping, level control, phase inversion, and summing			



RM20-9215-B

9215-FTx-EM

» SPECIFICATIONS

Electrical Power: 4 watts	AES Inputs Number of Inputs: 16-Ch unbalanced (nominal 48 kHz only) Impedance: 75 Ω Input Level: 0.1 V to 2.5 V p-p (5 V p-p tolerant) Resolution: 24-bit	SDI Output Number of Outputs: 1 Standard: SMPTE 292M, SMPTE 259M-C Impedance: 75 Ω terminating Return Loss: >15 dB to 1.485 GHz >10 dB 1.485 GHz to 2.97 GHz DC Offset: 0V ± 50 mV Rise and Fall Time(20-80%): 700 ps typical (270 Mbps) 120 ps
SDI Input Number of Inputs: 1 Standard: SMPTE 292M, SMPTE 259M-C Impedance: 75 Ω terminating Return Loss: > 15 dB to 1.485 GHz to 2.97 GHz Connector Type: > 300 m	Optical Output Number of Inputs: 1 Standard: SMPTE 259M-C, SMPTE 292M Nominal Wavelength: 1310 μm Output Power: -7 dBm to -2 dBm Connector Type: Single Mode, LC/UPC	

» ORDERING INFORMATION

9215-E0-EM HD/SD-SDI Fiber Audio Embedder Card

RM20-9215-B 20-Slot Frame Rear I/O Module (Standard Width) with 1 HD/SD-SDI Input BNC, 1 HD/SD-SDI Output BNC, 1 Optical LC Input, 8 AES Inputs (DIN 1.0/2.3 connectors)



9216-0E-DM » AES/EBU FIBER AUDIO DE-EMBEDDER



The 9216-0E-DM accepts HD/SD-SDI or fiber inputs and provides up to eight de-embedded AES pairs. The 9216-0E-DM offers full 24-bit audio processing/routing control (card edge and remote control) for individual channel gain, delay (up to 1 second), phase invert, as well as channel summing. AES outputs can be set to mute when routed channels fall below a selectable threshold. User presets allow fast and easy recall of custom settings.

» FEATURES

Conforms to SMPTE 259M and SMPTE 292M

Audio channel mapping, level control, phase inversion, and summing

Automatic detection of incoming data rate

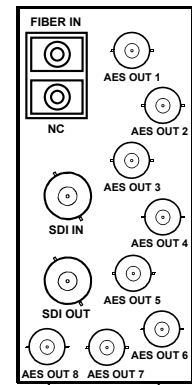
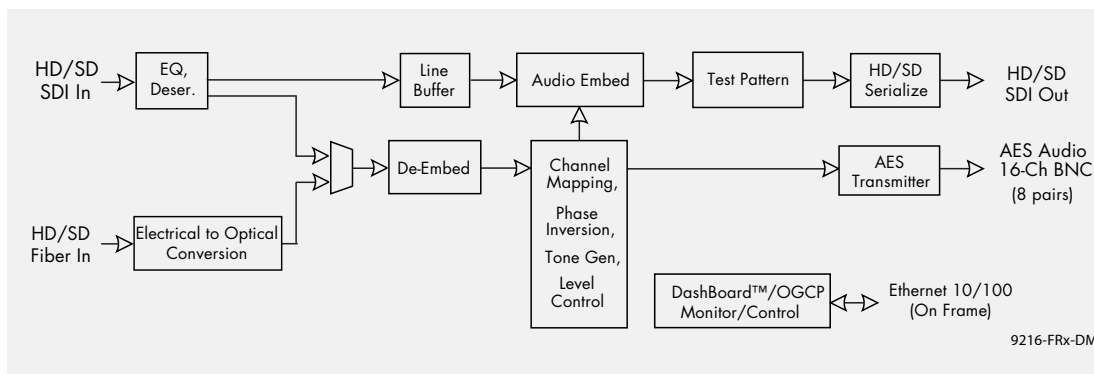
Remote monitoring via Dashboard™ software or OGCP-9000 control panel

LC/UPC optical connection

Audio delay user-adjustable up to one second

LED indicators for signal presence and data rate

Five-year warranty



RM20-9216-B

» SPECIFICATIONS

Electrical

Power: 4 watts

SDI Input

Number of Inputs: 1
 Standard: SMPTE 292M, SMPTE 259M-C
 Impedance: 75 Ω terminating
 Return Loss: > 15 dB to 1.485 GHz to 2.97 GHz
 Connector Type: > 300 m

Optical Input

Number of Inputs: 1
 Standard: 143-360 Mbps - SMPTE 259M
 1.485 Gbps - SMPTE 292
 Operating Wavelength Range: 1210 nm to 1600 nm
 Connector Type: Single Mode, LC/UPC

AES Outputs

Number of Outputs: 16-Ch unbalanced DIN 1.0/2.3
 Impedance: 75 Ω
 Sampling Rate: 48 kHz
 Resolution: 24-bit

SDI Output

Number of Outputs: 1
 Standard: SMPTE 292M, SMPTE 259M-C
 Impedance: 75 Ω terminating
 Return Loss: >15 dB to 1.485 GHz
 >10 dB 1.485 GHz to 2.97 GHz
 DC Offset: 0V ± 50 mV
 Rise and Fall Time(20-80%): 700 ps typical (270 Mbps) 120 ps

» ORDERING INFORMATION

9216-0E-DM AES/EBU Fiber Audio De-Embedder Card

RM20-9216-B 20-Slot Frame Rear I/O Module (Standard Width) 1 HD/SD-SDI Input BNC, 1 HD/SD-SDI Output BNC, 1 Optical LC Input, 8 AES Outputs (DIN 1.0/2.3 connectors)



9400 SERIES » COAX/FIBER MULTI-CHANNEL TRANSPORTS

with I/O Crosspoints



The 9400-series Coax/Fiber transport cards provide a card-based solution for high-density distribution and multiplexing between discrete coaxial (“BNC”) signals (such as 3G/HD/SD-SDI, ASI, and MADI) and fiber buses. Utilizing the openGear® open-architecture platform, the 9400-series offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface.

The 9400-series cards offer I/O crosspoints, allowing easy to configure and flexible routing between card inputs and outputs. Up to 10 of any 9400-series cards can be installed in our 20-Slot frame, offering support for up to 40 BNC input/outputs and 40 fiber input/outputs in a single frame. In addition to SD/HD-SDI support, the cards support a wide range of signals/standards from 5 Mb/s to 3 Gb/s. The scalability of the 9400-series offers a high degree of flexibility and density, maximizing economy of both space and costs. Full user remote and card-edge monitor/control allows full card status and control access locally or across a standard Ethernet network.

» BNC-to-Fiber (EO) Tx		» Fiber-to-BNC (OE) Rx	
9401	4 BNC In x 1 Fiber Out; 4x1 Crosspoint	9411	1 Fiber In x 4 BNC Out; 1x4 DA
9402	4 BNC In x 2 Fiber Out; 4x2 Crosspoint	9412	2 Fiber In x 4 BNC Out; 2x4 Crosspoint
9403	4 BNC In x 3 Fiber Out; 4x3 Crosspoint	9413	3 Fiber In x 4 BNC Out; 3x4 Crosspoint
9404	4 BNC In x 4 Fiber Out; 4x4 Crosspoint	9414	4 Fiber In x 4 BNC Out; 4x4 Crosspoint

» FEATURES

Card-based design allows scalability with up to 40 BNC/Fiber interfaces per frame

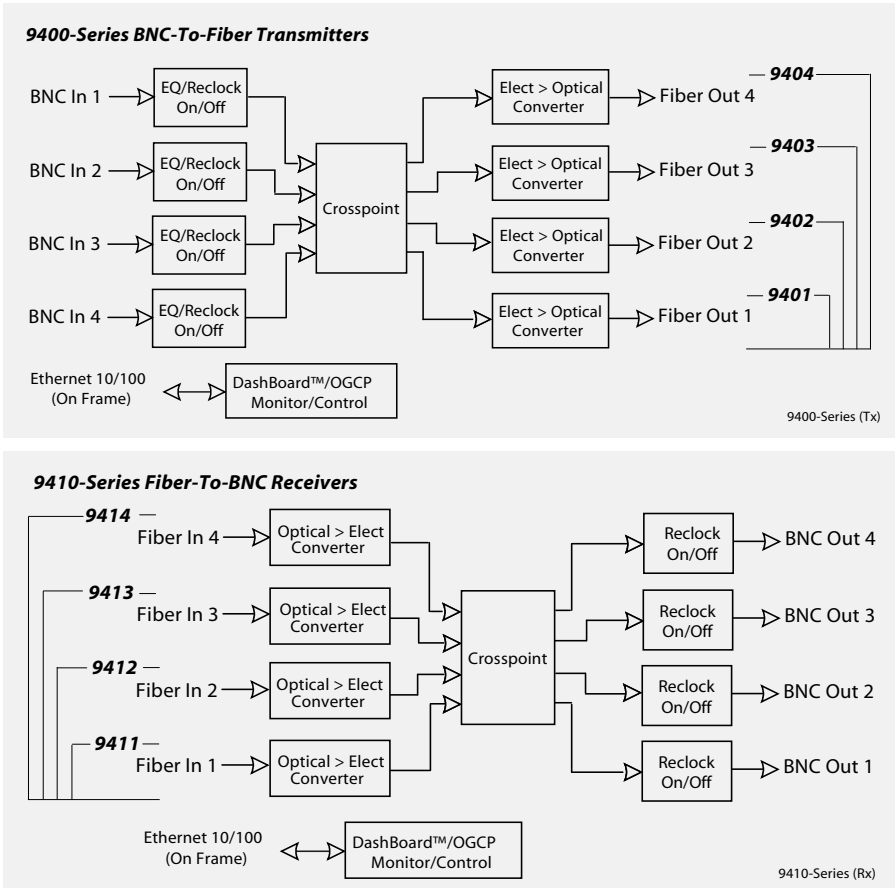
Low power/high-density design; only 10 Watts max. per card

Full support of SMPTE 424M, 292M, 259M and SMPTE 310M, SMPTE 344M, SMPTE 305M, M2S, DVB-ASI, and MADI standards/formats

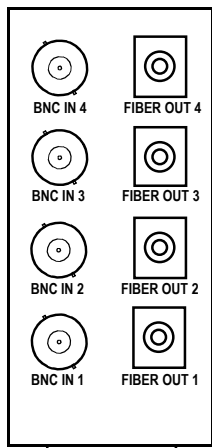
I/O crosspoints on all models allow selectable and flexible crosspoint distribution and DA functions on same card

Remote control/monitoring via DashBoard™ software, with soft-configurable crosspoint, EQ on/off, and reclock on/off.

Five-year warranty

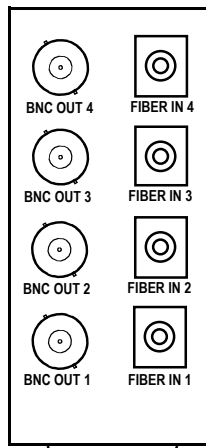


9400 SERIES



Note: FIBER OUT 4, 3, and 2 positions progressively depopulated on models 9403, 9402, and 9401, respectively.

RM20-9400-B



Note: FIBER IN 4, 3, and 2 positions progressively depopulated on models 9413, 9412, and 9411, respectively.

RM20-9410-B

» SPECIFICATIONS

Electrical

Power: 10 watts (max)

General

Tx/Rx Fiber Range: Single-Mode optics; rates thru SD: 40 km (24.8 mi) max
Single-Mode optics; rates thru HD: 24 km (14.9 mi) max

Fiber Connector: LC, ST, SC, or FC

Standards: SMPTE 259M-C, SMPTE 292M, SMPTE 425M, SMPTE 297M, DVB/ASI, HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M) with EDH, MADI (AES10-2003) (Not compatible with AES-3id (standard AES PCM))

9400-Series (Tx)

Input Type: BNC, 75Ω

Input/Output Loop Return Loss: >15 dB up to 1.5 GHz
>10 dB up to 3 GHz

Transmitter Wavelength: 1310 nm Single Mode

Optical Power: -5 dBm to 0 dBm

Laser Power Range: Laser Class 1

Added Jitter: <0.03 UI under 1 MHz

9410-Series (Rx)

Input Type: Fiber LC, ST, SC, or FC

Wavelength: 1100 to 1600nm

Optical Sensitivity: Pathological 3Gbps: -18 dBm
Pathological HD-SDI: -20 dBm

Output Type: BNC, 75Ω

Output Return Loss: >15 dB up to 1.5 GHz
>10 dB up to 3 GHz

Added Jitter: <0.03 UI under 1 MHz

» ORDERING INFORMATION

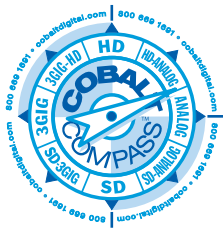
9401	4 In / 1 Out BNC-to-Fiber Transmitter / Crosspoint Card
9402	4 In / 2 Out BNC-to-Fiber Transmitter / Crosspoint Card
9403	4 In / 3 Out BNC-to-Fiber Transmitter / Crosspoint Card
9404	4 In / 4 Out BNC-to-Fiber Transmitter / Crosspoint Card
9411	1 In / 4 Out Fiber-to-BNC Receiver / Crosspoint Card
9412	2 In / 4 Out Fiber-to-BNC Receiver / Crosspoint Card
9413	3 In / 4 Out Fiber-to-BNC Receiver / Crosspoint Card
9414	4 In / 4 Out Fiber-to-BNC Receiver / Crosspoint Card
RM20-9404-B	20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, 4 Fiber Out

RM20-9403-B	20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, 3 Fiber Out
RM20-9402-B	20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, 2 Fiber Out
RM20-9401-B	20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, 1 Fiber Out
RM20-9414-B	20-Slot Frame Rear I/O Module (Standard Width) 4 Fiber In, 4 BNC Out
RM20-9413-B	20-Slot Frame Rear I/O Module (Standard Width) 3 Fiber In, 4 BNC Out
RM20-9412-B	20-Slot Frame Rear I/O Module (Standard Width) 2 Fiber In, 4 BNC Out
RM20-9411-B	20-Slot Frame Rear I/O Module (Standard Width) 1 Fiber In, 4 BNC Out

Note: Add fiber connector suffix to part numbers above to specify fiber connection type (LC, ST, SC, FC). (For example, RM20-9404-B fitted with LC connectors is ordered as "RM20-9404-B-LC".)

9400 EO SERIES » CWDM TRANSMITTERS

SDI/ASI/MADI Coax-to-Fiber Multi-Channel Transmitters (Electrical-to-Optical)



Coarse Wave Division Multiplexing (CWDM) offers a cost-effective, scalable, and convenient solution for multiplexing and de-multiplexing discrete coaxial channels onto a common fiber pipeline. The 9400-EO-CWDM series Coax-To-Fiber CWDM transmitters allow up to four separate SDI, ASI, or MADI streams to be multiplexed onto a fiber-optic trunk using CWDM. Available in numerous wavelength divisions and fiber connector types, the 9400-EO-CWDM series provide a card-based solution for high-density distribution and multiplexing between discrete coax signals and a fiber trunk. With up to four coaxial channels accommodated per card and 18 available discrete fiber wavelengths, the 9400-CWDM series can accommodate up to 18 discrete coax channels over a single fiber trunk. Utilizing the openGear® open-architecture platform, the 9400-EO-CWDM series offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface.

Up to 10 of any 9400-series cards can be installed in a 20-slot frame. In addition to 3G/HD/SD-SDI support, the cards support a wide range of signals/standards from 5 Mb/s to 3Gb/s. Full user remote and card-edge monitor/control allows full card status and control access locally or across a standard Ethernet network using DashBoard remote control.

» FEATURES

Card-based design allows scalability with up to 40 BNC/Fiber interfaces per frame

Available in quad wavelength (9404), triple wavelength (9403), dual wavelength (9402), and single wavelength (9401) electrical-to-optical muxing versions

Low power/high-density design; only 10 Watts max. per card

Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode EQ/reclocking. No switches to set for different payloads.

Compatible with SMPTE 425, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio

Status indicators for data rate and lock

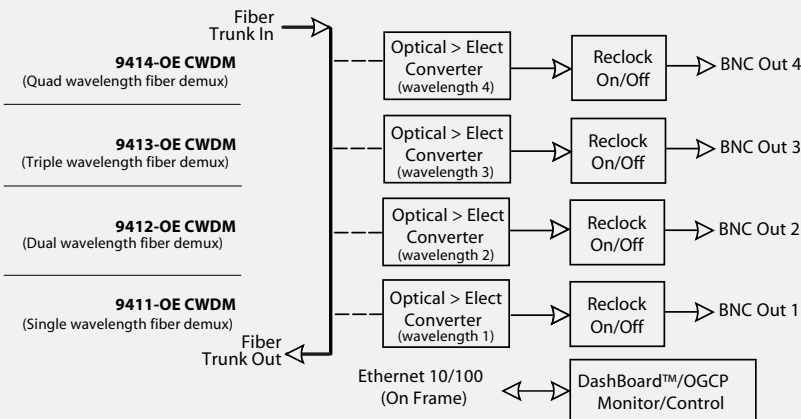
Error-free pathological support

Available with LC, ST, SC, or FC fiber termination

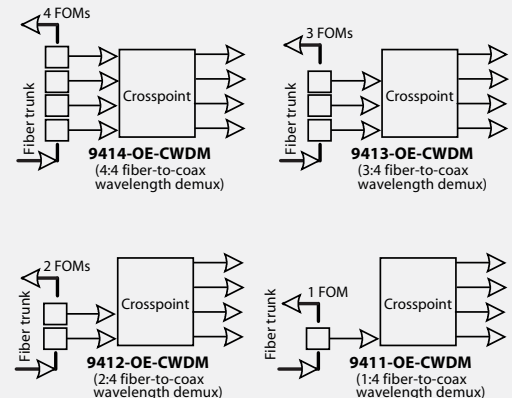
Remote control/monitoring via DashBoard™ software, with soft-configurable crosspoint, EQ on/off, and reclock on/off

Five-year warranty

9410-RX-CWDM Series — CWDM Fiber-To-Coax Receivers



9410-RX CWDM Series



» SPECIFICATIONS

Electrical

Power: 10 W (max)

General

Tx/Rx Fiber Range: Single-Mode optics; rates thru SD: 40 km (24.8 mi) max
Single-Mode optics; rates thru HD: 24 km (14.9 mi) max

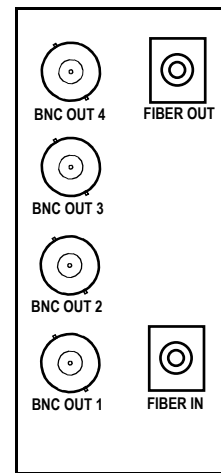
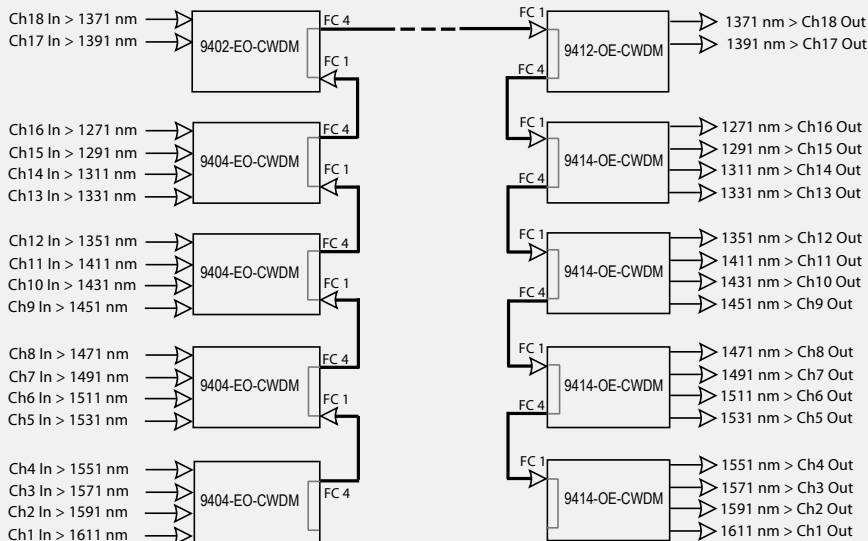
Fiber Connector Type: LC, ST, SC, or FC (see Ordering Information)
Standards Supported: SMPTE 259M-C, SMPTE 292M, SMPTE 425M, SMPTE 297M, DVB/ASI, HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M) with EDH, Composite analog video (PAL/NTSC)
Input Type: (4) BNC, 75Ω

Input Loop Return Loss: >15 dB up to 1.5 GHz
>10 dB up to 3 GHz
Fiber In/Out Loop: (2) fiber connector I/O pair
Fiber Loop Output Optical Power: -5 dBm to 0 dBm
Fiber Loop Input Optical Sensitivity: Pathological 3Gbps: -18 dBm
Pathological HD-SDI: -20 dBm
Laser Power Range: Laser Class 1
Added Jitter: <0.03 UI under 1 MHz



9400 EO SERIES

Example of 18-Channel CWDM Using 9400-CWDM Cards



**RM20-9411-CWDM-B
THRU
RM20-9414-CWDM-B**

The orderable wavelengths provide for a simple “building-block” approach to provisioning channel mux/de-mux onto a single fiber pipeline. Shown here is the maximum wavelength complement available accommodating 18 channels. Provisioning is as simple as using one or more card transmitter models, and then using the companion receiver models having the same fiber-channel count and wavelengths. (For example, an 8-channel setup can use two 9404-EO-CWDM transmitter cards, and then use two companion 9414-OE-CWDM receiver cards ordered with the same wavelength blocks (for example, “1271-1291-1311-1331” and “1351-1411-1431-1451” respectively for the two TX and RX cards.)

ORDERING INFORMATION

9404-EO-CWDM-WX-WX-WX-WX Quad Wavelength Coax-to-Fiber CWDM Transmitter Card (please substitute wavelengths in place of each “-WX” in part number when ordering; see Note below)

9403-EO-CWDM-WX-WX-WX Triple Wavelength Coax-to-Fiber CWDM Transmitter Card (please substitute wavelengths in place of each “-WX” in part number when ordering; see Note below)

9402-EO-CWDM-WX-WX Dual Wavelength Coax-to-Fiber CWDM Transmitter Card (please substitute wavelengths in place of each “-WX” in part number when ordering; see Note below)

9401-EO-CWDM-WX Single Wavelength Coax-to-Fiber CWDM Transmitter Card (please substitute wavelengths in place of each “-WX” in part number when ordering; see Note below)

Note: Add fiber wavelengths for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1371, 1391, 1271, 1291, 1311, 1331, 1351, 1411, 1431, 1451, 1471, 1494, 1511, 1531, 1551, 1571, 1591, 1611 (Example: For wavelengths 1271-1291-1311-1331 for 9404 card, order as “9404-EO-CWDM-1271-1291-1311-1331”)

Note: Make certain when ordering companion RX cards that the same wavelength groupings are correspondingly also specified.

RM20-9404-CWDM-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, Fiber I/O Loop (please substitute fiber connector type in place of “-XX” in part number when ordering; see Note below)

RM20-9403-CWDM-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, Fiber I/O Loop (please substitute fiber connector type in place of “-XX” in part number when ordering; see Note below)

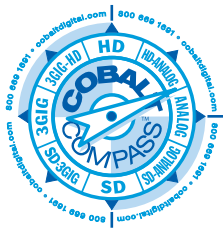
RM20-9402-CWDM-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, Fiber I/O Loop (please substitute fiber connector type in place of “-XX” in part number when ordering; see Note below)

RM20-9401-CWDM-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC In, Fiber I/O Loop (please substitute fiber connector type in place of “-XX” in part number when ordering; see Note below)

Note: Add fiber connector suffix to part numbers to specify fiber connection type (LC, ST, SC, FC) when ordering. (Example: For RM20-9404-CWDM-B with type LC fiber connectors, order as “RM20-9404-CWDM-B-LC”.)

9400 OE SERIES » CWDM RECEIVERS

SDI/ASI/MADI Fiber-to-Coax Multi-Channel Receivers



Coarse Wave Division Multiplexing (CWDM) offers a cost-effective, scalable, and convenient solution for multiplexing and de-multiplexing discrete coaxial channels onto a common fiber pipeline. The 9400-OE-CWDM series Fiber-to-Coax CWDM receivers allow up to four separate SDI, ASI, or MADI streams to be de-multiplexed from a fiber-optic trunk where embedded using CWDM. Available in numerous wavelength divisions and fiber connector types, the 9400-OE-CWDM series provide a card-based solution for high-density distribution and de-multiplexing between a fiber trunk and discrete coax signals. With up to four coaxial channels accommodated per card and 18 available discrete fiber wavelengths, the 9400-CWDM series can accommodate up to 18 discrete coax channels over a single fiber trunk. Utilizing the openGear® open-architecture platform, the 9400-OE-CWDM series offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface.

Up to 10 of any 9400-series cards can be installed in a 20-slot frame. In addition to 3G/HD/SD-SDI support, the cards support a wide range of signals/standards from 5 Mb/s to 3Gb/s. Full user remote and card-edge monitor/control allows full card status and control access locally or across a standard Ethernet network using DashBoard remote control.

» FEATURES

Card-based design allows scalability with up to 40 BNC/Fiber interfaces per frame

Available in quad wavelength (9414), triple wavelength (9413), dual wavelength (9412), and single wavelength (9411) optical-to-electrical de-muxing versions

Low power/high-density design; only 10 Watts max. per card

Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode reclocking. No switches to set for different payloads.

Compatible with SMPTE 425, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio

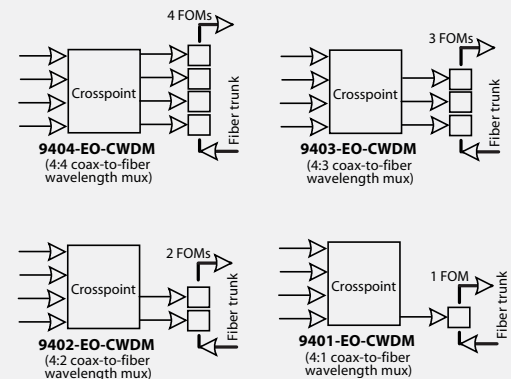
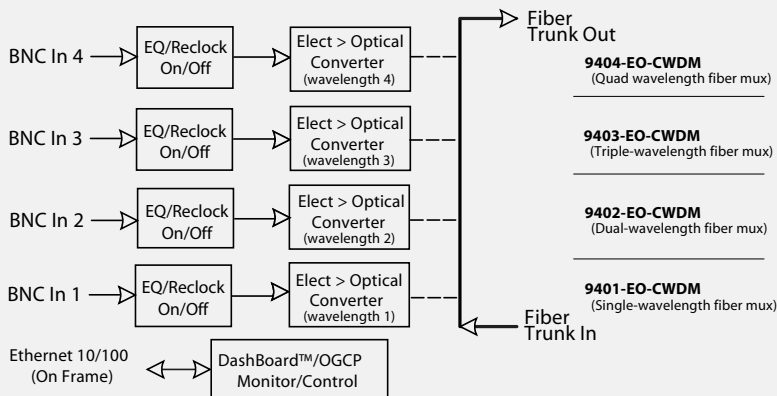
Status indicators for data rate and lock Error-free pathological support

Available with LC, ST, SC, or FC fiber termination

Remote control/monitoring via DashBoard™ software, with soft-configurable crosspoint and reclock on/off

Five-year warranty

9400-EO-CWDM Series — CWDM Coax-To-Fiber Transmitters



9400CWDM-Series (Tx)

» SPECIFICATIONS

Electrical

Power: 10 W (max)

General

Tx/Rx Fiber Range: Single-Mode optics; rates thru SD: 40 km (24.8 mi) max
Single-Mode optics; rates thru HD: 24 km (14.9 mi) max
Fiber Connector Type: LC, ST, SC, or FC (see Ordering Information)

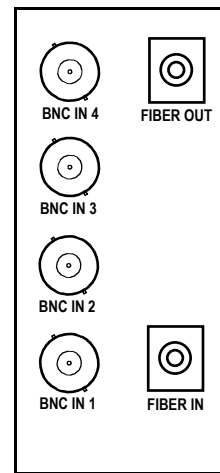
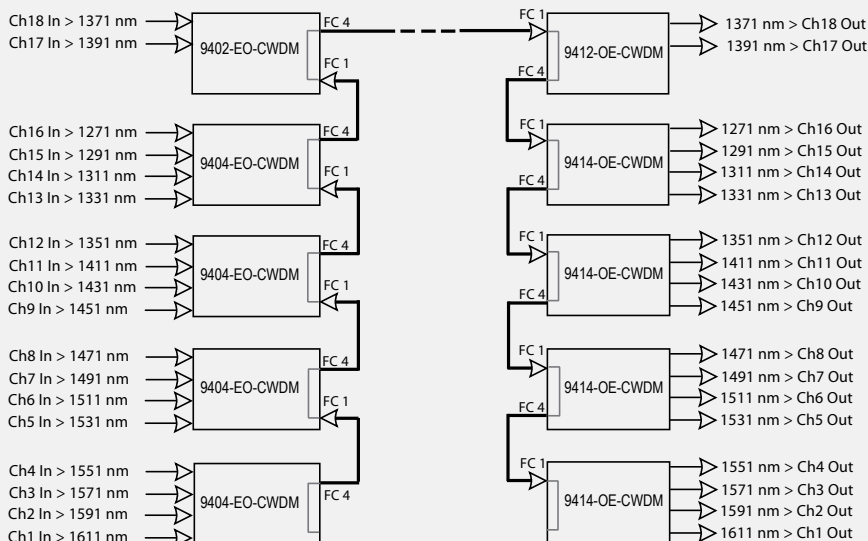
Standards Supported: SMPTE 259M-C, SMPTE 292M, SMPTE 425M, SMPTE 297M, DVB/ASI, HD-SDI (SMPTE 292M), SD-SDI (SMPTE 259M) with EDH, Composite analog video (PAL/NTSC)
Output Type: (4) BNC, 75Ω
Output Loop Return Loss: >15 dB up to 1.5 GHz
>10 dB up to 3 GHz

Fiber In/Out Loop: (2) fiber connector I/O pair
Fiber Loop Input Optical Sensitivity: Pathological 3Gbps: -18 dBm
Pathological HD-SDI: -20 dBm
Fiber Loop Output Optical Power: -5 dBm to 0 dBm
Added Jitter: <0.03 UI under 1 MHz



9400 OE SERIES

Example of 18-Channel CWDM Using 9400-CWDM Cards



**RM20-9411-CWDM-B
THRU
RM20-9414-CWDM-B**

The orderable wavelengths provide for a simple “building-block” approach to provisioning channel mux/de-mux onto a single fiber pipeline. Shown here is the maximum wavelength complement available accommodating 18 channels. Provisioning is as simple as using one or more card transmitter models, and then using the companion receiver models having the same fiber channel count and wavelengths. (For example, an 8-channel setup can use two 9404-EO-CWDM transmitter cards, and then use two companion 9414-OE-CWDM receiver cards ordered with the same wavelength blocks (for example, “1271-1291-1311-1331” and “1351-1411-1431-1451” respectively for the two TX and RX cards.)

ORDERING INFORMATION

9414-OE-CWDM-WX-WX-WX-WX Quad Wavelength Fiber-to-Coax CWDM Receiver Card (please substitute wavelengths in place of each “-WX” in part number when ordering; see Note below)

9413-OE-CWDM-WX-WX-WX Triple Wavelength Fiber-to-Coax CWDM Receiver Card (please substitute wavelengths in place of each “-WX” in part number when ordering; see Note below)

9412-OE-CWDM-WX-WX Dual Wavelength Fiber-to-Coax CWDM Receiver Card (please substitute wavelengths in place of each “-WX” in part number when ordering; see Note below)

9411-OE-CWDM-WX Single Wavelength Fiber-to-Coax CWDM Receiver Card (please substitute wavelengths in place of each “-WX” in part number when ordering; see Note below)

Note: Add fiber wavelengths for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1371, 1391, 1271, 1291, 1311, 1331, 1351, 1411, 1431, 1451, 1471, 1494, 1511, 1531, 1551, 1571, 1591, 1611 (Example: For wavelengths 1271-1291-1311-1331 for 9414 card, order as “9414-OE-CWDM-1271-1291-1311-1331”)

Note: Make certain when ordering companion RX cards that the same wavelength groupings are correspondingly also specified.

RM20-9414-CWDM-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC Out, Fiber I/O Loop (please substitute fiber connector type in place of “-XX” in part number when ordering; see Note below)

RM20-9413-CWDM-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC Out, Fiber I/O Loop (please substitute fiber connector type in place of “-XX” in part number when ordering; see Note below)

RM20-9412-CWDM-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC Out, Fiber I/O Loop (please substitute fiber connector type in place of “-XX” in part number when ordering; see Note below)

RM20-9411-CWDM-B-XX 20-Slot Frame Rear I/O Module (Standard Width) 4 BNC Out, Fiber I/O Loop (please substitute fiber connector type in place of “-XX” in part number when ordering; see Note below)

Note: Add fiber connector suffix to part numbers to specify fiber connection type (LC, ST, SC, FC) when ordering. (Example: For RM20-9414-CWDM-B with type LC fiber connectors, order as “RM20-9414-CWDM-B-LC”.)

9433-DE8-AA » 3G/HD/SD-SDI 8-CHANNEL BALANCED ANALOG AUDIO DE-EMBEDDER with Fiber Optic I/O



The all-new Cobalt® 9433-DE8-AA 3G/HD/SD-SDI 8-Channel Balanced Analog Audio De-Embedder with Fiber Optic I/O offers balanced audio de-embedding with the built-in convenience of either coaxial or fiber SDI I/O in a basic, economical, high-efficiency openGear® card. The 9433-DE8-AA provides de-embedding of professional balanced audio at 0 dBFS to pro 24 dBu levels using full 24-bit conversion. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. The 9433-DE8-AA is available with numerous CWDM wavelengths that allow the card to be used with CWDM systems.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Convenient EO / OE fiber interfaces and coaxial SDI I/O

Eight balanced analog audio outputs with user-selectable flexible de-embedding from groups 1 thru 4

DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

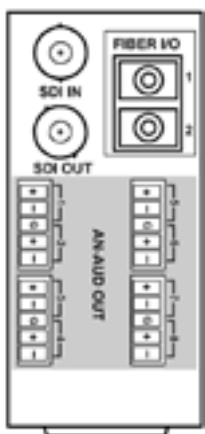
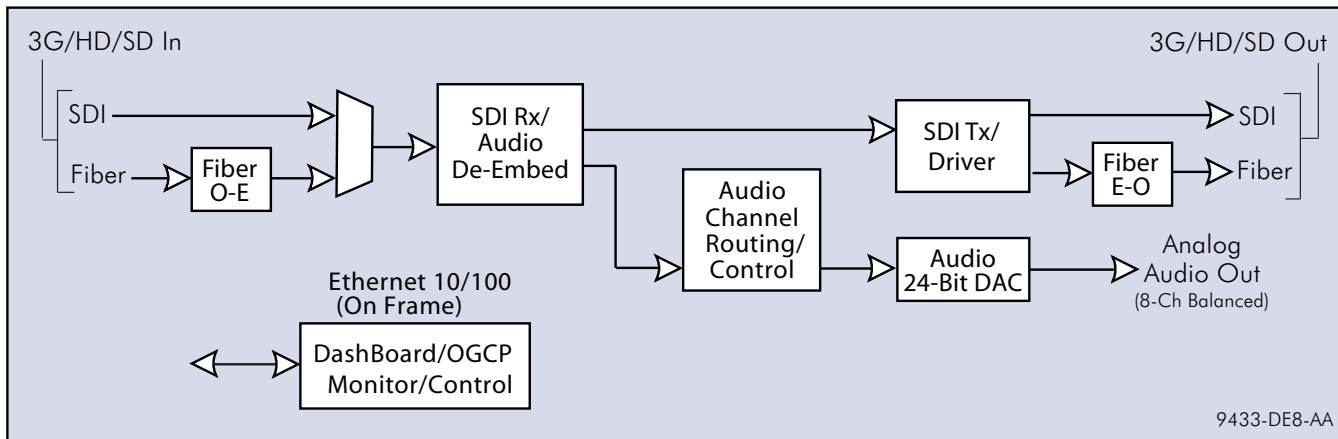
Balanced audio de-embed with full 0 dBFS-to-24 dBu 24-bit conversion

Low-power/high-density design – less than 18 Watts per card

Available with CWDM wavelength divisions allowing use in CWDM systems

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty



RM20-9433DE8-B



9433-DE8-AA

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI/Fiber Inputs/Outputs

(1) 75Ω BNC inputs

(1) 75Ω BNC output

SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

(1) Fiber input; LC connector

(1) Fiber output; LC connector

Fiber Wavelength, Tx: 1310 nm

Receive Sensitivity: -16 to -3 dBm; 1260 to 1310 nm

Tx Power: -5.0 dBm (min)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio conversion format

48 kHz sampling, 24-bit. Supports inputs up to 0 dBFS to 24 dBu

Analog Audio Outputs

(8) Balanced analog audio outputs

I/O conforms to 0 dBFS = +24 dBu

Output Impedance: < 50 Ω

Reference Level: -20 dBFS

Nominal Level: +4 dBu

Max Output Level: +24 dBu (0 dBFS)

Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

SNR: 115 dB (A weighted)

THD+N: -96 dB (20 Hz to 10 kHz)

Crosstalk: -106 dB (20 Hz to 20 kHz)

ORDERING INFORMATION

9433-DE8-AA 3G/HD/SD-SDI 8-Channel Balanced Analog Audio De-Embedder with Fiber Optic I/O

9433-DE8-AA-WX 3G/HD/SD-SDI 8-Channel Balanced Analog Audio De-Embedder with Fiber Optic CWDM I/O

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm -29: 1290nm -31: 1310nm

-33: 1330nm -35: 1350nm -41: 1410nm

-43: 1430nm -45: 1450nm -47: 1470nm

-49: 1490nm -51: 1510nm -53: 1530nm

-55: 1550nm -57: 1570nm -59: 1590nm

-61: 1610nm

RM20-9433DE8-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) Balanced Analog Audio Outputs, (1) 3G/HD/SD-SDI Output BNC, (2) Fiber I/O (LC connectors)

9433-EM8-AA » 3G/HD/SD-SDI 8-CHANNEL BALANCED ANALOG AUDIO EMBEDDER with Fiber Optic I/O



The all-new Cobalt® 9433-EM8-AA 3G/HD/SD-SDI 8-Channel Balanced Analog Audio Embedder with Fiber Optic I/O offers balanced audio embedding with the built-in convenience of either coaxial or fiber SDI I/O in a basic, economical, high-efficiency openGear® card. The 9433-EM8-AA provides embedding from professional balanced audio 24 dBu levels to 0 dBFS to using full 24-bit conversion. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. The 9433-EM8-AA is available with numerous CWDM wavelengths that allow the card to be used with CWDM systems.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Convenient EO / OE fiber interfaces and coaxial SDI

Eight balanced analog audio inputs with user-selectable flexible embedding to groups 1 thru 4

DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

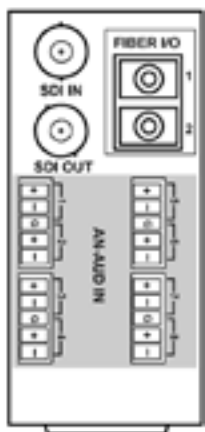
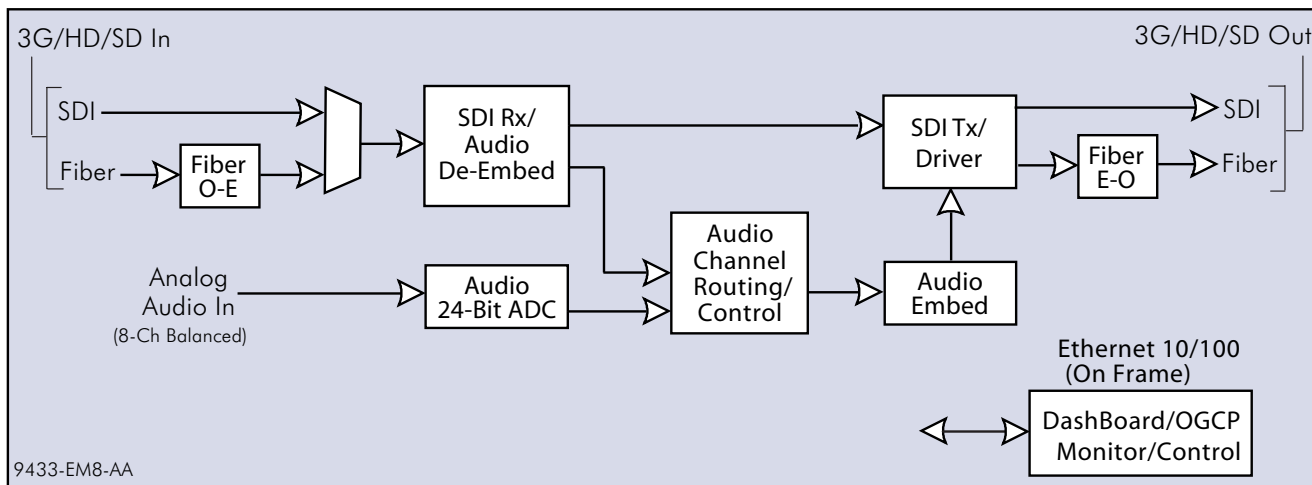
Balanced audio embed with full 24 dBu-to-0 dBFS 24-bit conversion

Low-power/high-density design – less than 18 Watts per card

Available with CWDM wavelength divisions allowing use in CWDM systems

Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panels

Five year warranty



RM20-9433EM8-B



9433-EM8-AA

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI/Fiber Inputs/Outputs

(1) 75Ω BNC inputs

(1) 75Ω BNC output

SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

(1) Fiber input; LC connector

(1) Fiber output; LC connector

Fiber Wavelength, Tx: 1310 nm

Receive Sensitivity: -16 to -3 dBm; 1260 to 1310 nm

Tx Power: -5.0 dBm (min)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio conversion format

48 kHz sampling, 24-bit. Supports inputs up to 24 dBu

Analog Audio Inputs

(8) Balanced analog audio inputs

I/O conforms to +24 dBu = 0 dBFS

Input Impedance: >10 kΩ

Reference Level: -20 dBFS

Nominal Level: +4 dBu

Input Clip Level: +24 dBu (0 dBFS)

Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

SNR: 115 dB (A weighted)

THD+N: -96 dB (20 Hz to 10 kHz)

Crosstalk: -106 dB (20 Hz to 20 kHz)

ORDERING INFORMATION

9433-EM8-AA 3G/HD/SD-SDI 8-Channel Balanced Analog Audio Embedder with Fiber Optic I/O

9433-EM8-AA-WX 3G/HD/SD-SDI 8-Channel Balanced Analog Audio Embedder with Fiber Optic CWDM I/O

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm -29: 1290nm -31: 1310nm

-33: 1330nm -35: 1350nm -41: 1410nm

-43: 1430nm -45: 1450nm -47: 1470nm

-49: 1490nm -51: 1510nm -53: 1530nm

-55: 1550nm -57: 1570nm -59: 1590nm

-61: 1610nm

RM20-9433EM8-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) Balanced Analog Audio Inputs, (1) 3G/HD/SD-SDI Output BNC, (2) Fiber I/O (LC connectors)

9433-EMDE8-AES110 » 3G/HD/SD-SDI 8-PAIR (16-CH) BALANCED AES AUDIO EMBEDDER/DE-EMBEDDER with Fiber Optic I/O



The new for 2015 Cobalt® 9433-EMDE8-AES110 3G/HD/SD-SDI 8-Pair (16-Ch) Balanced AES Audio Embedder / De-Embedder with Fiber Optic I/O offers balanced AES (AES/EBU) embedding/de-embedding with the built-in convenience of either coaxial or fiber SDI I/O in a basic, economical, high-efficiency openGear® card.

The 9433-EMDE8-AES110 provides full 16-channel embed and de-embed between AES and all four groups of embedded audio. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. The 9433-EMDE8-AES110 is available with numerous CWDM wavelengths that allow the card to be used with CWDM systems.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Convenient EO / OE fiber interfaces and coaxial SDI

8-pair (16-channel) balanced AES support. Individual per-pair embedding or de-embedding.

DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

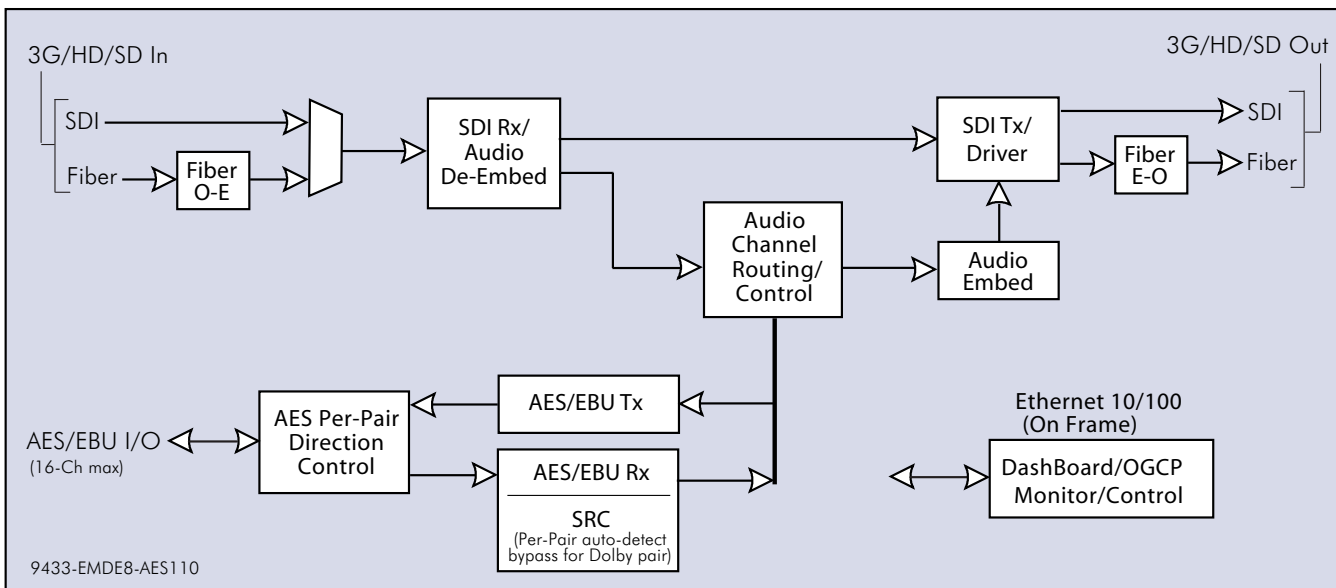
Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

Low-power/high-density design – less than 18 Watts per card

Available with CWDM wavelength divisions allowing use in CWDM systems

Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panels

Five year warranty



9433-EMDE8-AES110

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI/Fiber Inputs/Outputs

(1) 75Ω BNC inputs

(1) 75Ω BNC output

SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

(1) Fiber input; LC connector

(1) Fiber output; LC connector

Fiber Wavelength, Tx: 1310 nm

Receive Sensitivity: -16 to -3 dBm; 1260 to 1310 nm

Tx Power: -5.0 dBm (min)

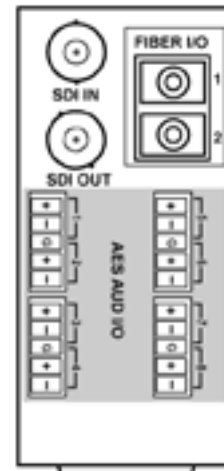
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs.

AES Audio Input/Output

(8) Balanced AES/EBU audio input/outputs with per-pair port direction controls



RM20-9433AES110-B

ORDERING INFORMATION

9433-EMDE8-AES110 3G/HD/SD-SDI 8-Pair (16-Ch) Balanced AES Audio Embedder / De-Embedder with Fiber Optic I/O

9433-EMDE8-AES110-WX 3G/HD/SD-SDI 8-Pair (16-Ch) Balanced AES Audio Embedder / De-Embedder with Fiber Optic CWDM I/O

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm -29: 1290nm -31: 1310nm

-33: 1330nm -35: 1350nm -41: 1410nm

-43: 1430nm -45: 1450nm -47: 1470nm

-49: 1490nm -51: 1510nm -53: 1530nm

-55: 1550nm -57: 1570nm -59: 1590nm

-61: 1610nm

RM20-9433AES110-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) Balanced AES Audio I/O, (1) 3G/HD/SD-SDI Output BNC, (2) Fiber I/O (LC connectors)

9433-EMDE16-AES75 » 3G/HD/SD-SDI 16-PAIR (32-CH) UNBALANCED AES AUDIO EMBEDDER/DE-EMBEDDER

with Fiber Optic I/O



The all-new Cobalt® 9433-EMDE16-AES75 3G/HD/SD-SDI 16-Pair (32-Ch) Unbalanced AES Audio Embedder / De-Embedder with Fiber Optic I/O offers unbalanced AES (AES-3id) embedding/de-embedding with the built-in convenience of either coaxial or fiber SDI I/O in a basic, economical, high-efficiency openGear® card. While a basic embedder/de-embedder, the 9433-EMDE16-AES75 is big on capacity, with up to 32 channels of simultaneous embedding/de-embedding.

The 9433-EMDE16-AES75 provides full 32-channel embed and de-embed between AES and all four groups of embedded audio. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair. Fully error-free pathological pattern operation is fully compatible with professional fiber video interfaces. The 9433-EMDE16-AES75 is available with numerous CWDM wavelengths that allow the card to be used with CWDM systems.

Full audio crosspoint allows per-channel gain and routing controls, as well as built-in tone generators.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Convenient EO / OE fiber interfaces and coaxial SDI

16-pair (32-channel) coaxial AES support. Individual per-pair embedding or de-embedding.

DashBoard™ status display, audio meters, tone generators. GUI audio meters provide ready assessment of content presence and line-up.

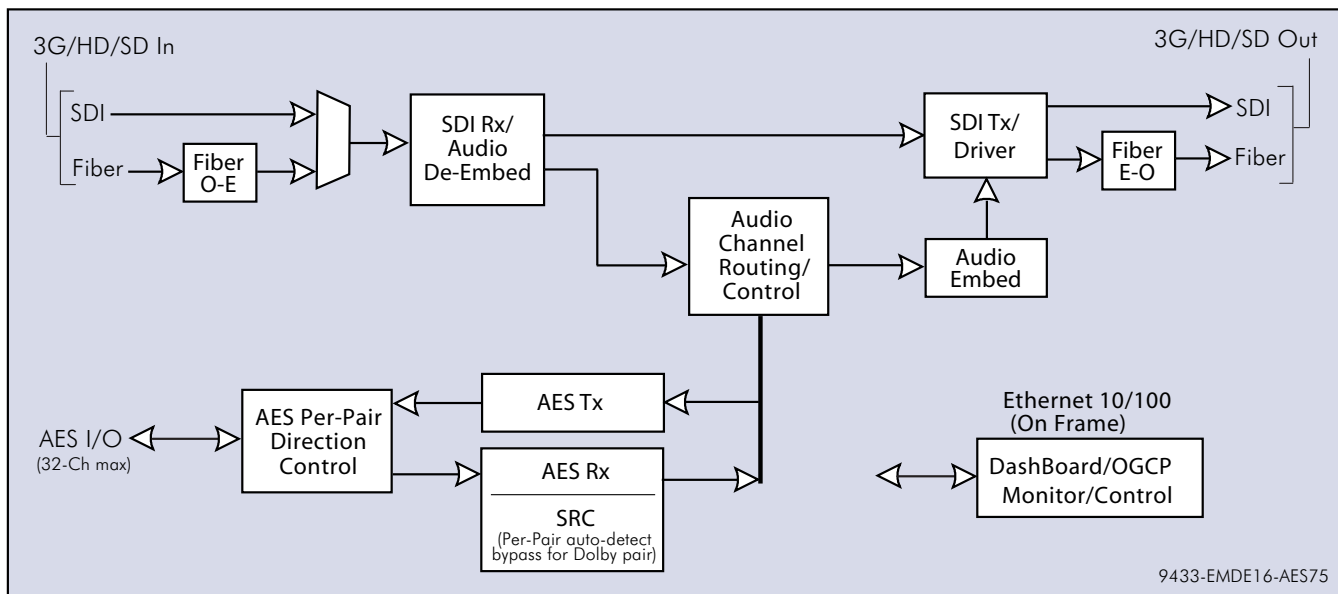
Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

Low-power/high-density design – less than 18 Watts per card

Available with CWDM wavelength divisions allowing use in CWDM systems

Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panels

Five year warranty



9433-EMDE16-AES75

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

<18 Watts

SDI/Fiber Inputs/Outputs

(1) 75Ω BNC inputs

(1) 75Ω BNC output

SDI Receive Cable Length (1694A): 120m/180m/360m (3G/HD/SD)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

(1) Fiber input; LC connector

(1) Fiber output; LC connector

Fiber Wavelength, Tx: 1310 nm

Receive Sensitivity: -16 to -3 dBm; 1260 to 1310 nm

Tx Power: -5.0 dBm (min)

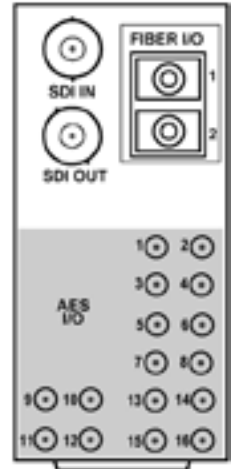
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Audio Conversion Format

48 kHz sampling, 24-bit. Auto-SRC bypass for Dolby inputs.

AES Audio Input/Output

(16) Unbalanced AES audio input/outputs (AES-3id) with per-pair port direction controls



RM20-9433AES75-B-DIN
RM20-9433AES75-B-HDBNC

ORDERING INFORMATION

9433-EMDE16-AES75 3G/HD/SD-SDI 16-Pair (32-Ch) Unbalanced AES Audio Embedder / De-Embedder with Fiber Optic I/O

9433-EMDE16-AES75-WX 3G/HD/SD-SDI 16-Pair (32-Ch) Unbalanced AES Audio Embedder / De-Embedder with Fiber Optic CWDM I/O

Use fiber wavelength codes below for card Fiber Optic Modules (FOMs) when ordering. Available wavelengths (in nm) are as follows: 1270, 1290, 1310, 1330, 1350, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610.

In "WX" places in part number, substitute code for wavelengths in each place as listed below:

-27: 1270nm -29: 1290nm -31: 1310nm

-33: 1330nm -35: 1350nm -41: 1410nm

-43: 1430nm -45: 1450nm -47: 1470nm

-49: 1490nm -51: 1510nm -53: 1530nm

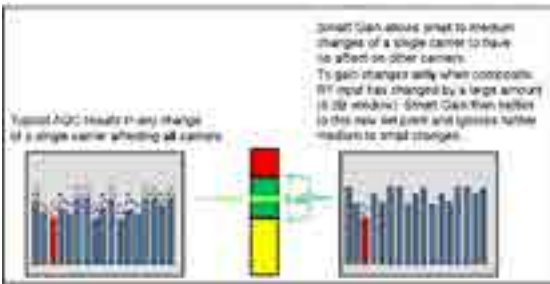
-55: 1550nm -57: 1570nm -59: 1590nm

-61: 1610nm

RM20-9433AES75-B-DIN 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (2) Fiber I/O (LC connectors), (16) Coaxial AES Audio I/O (DIN 1.0/2.3)

RM20-9433AES75-B-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) 3G/HD/SD-SDI Output BNC, (2) Fiber I/O (LC connectors), (16) Coaxial AES Audio I/O (HD-BNC)

9420 » L-BAND / IF-BAND RF-FIBER TRANSMITTER AND RECEIVER



The 9420-Series of linear RF-Fiber (E-O) Transmitter and linear Fiber-RF (O-E) Receiver SATCOM Fiber Optic Link Cards provides an easily integrated openGear® solution for a fiber optic link between an LNB and an IRD. With models specifically optimized for L-band and IF-band linear RF communications, the card combination of fiber transmitter and receiver allows up to 30 km of transport length. The cards fit our standard 20-slot frames and utilize blind mate connection between the card and its rear module, allowing card installation without requiring rear access to the frame or its connections.

The 9420 transmit (Tx) cards offer Smart Gain to help provide stable gain control in the presence of varying input signal levels. This helps maintain constant operating power in these conditions.

Full user Dashboard™ remote control allows full status and control access locally or across a standard Ethernet network.

» FEATURES

Models specifically optimized for L-Band and IF-band signals

Supports up to 30 km links

Optically-Isolated DFB Lasers enable high-dynamic-range links

25 dB Tx and Rx adjustable gain range

One-button Peak Optimizer allows quick and easy set-up

SmartGain provides enhanced AGC performance

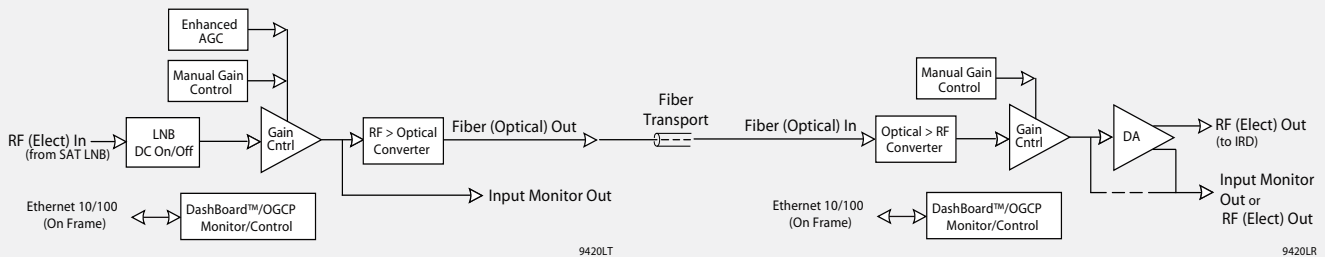
LNB power sourcing - LNB power can be enabled or disabled as desired

Tx / Rx RF power monitoring via Dashboard, card-edge LEDs, monitoring ports, and SNMP

Blind mate rear module connections allow card installation without requiring rear frame access

Five year warranty

Combined E-O Tx (9420LT) and O-E Rx (9420LR) L-Band Fiber Optic Link



» SPECIFICATIONS

9420 RF-FIBER (E-O) TRANSMITTER CARDS

Power
12 Watts.

Input/Outputs
Inputs: (1) 75Ω RF input; 850-2300 MHz (L-band) with LNB DC power inject enable/disable
Outputs: (1) Fiber Optic (LC-APC or SC-APC terminations). (1) Monitor port 75Ω.
Fiber Wavelength: 1310, 1550 nm

Performance
Fiber Transport Length: up to 30 km
Optical Output Power: 5 ±2 dBm
Frequency Range:
(L-Band) 850-2300 MHz
(IF-Band) 50-1000 MHz
Input Return Loss (minimum): 10 dB
Total Front-End RF Gain(1) (at minimum attenuation setting): 25 ±2 dB
Attenuation Adjustment Range: 30 dB
Spurs Free Dynamic Range(2): 98 dB-Hz
Noise Figure (at maximum gain, 25°C): 23 dB
Input IP3 (at maximum gain, 25°C): -4 dBm
Total RF Power Into Laser: 2 ±2dBm

1. Link RF Gain dB = TG + RG - 2*Fiber Loss dBo
2. SFDR = 2/3*(IIP3 + 174 - NF).Power

9420 FIBER-RF (O-E) RECEIVER CARDS

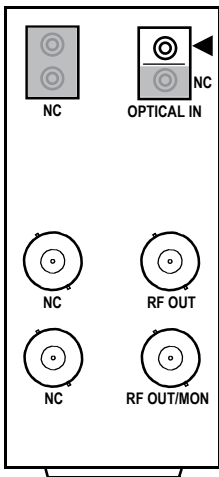
Power
12 Watts

Input/Outputs
Inputs: (1) Fiber Optic; LC-APC or SC-APC terminations.
Outputs: (1) 75Ω RF input; 850-2300 MHz (L-band). (1) Monitor port 75Ω.
Fiber Wavelength: 1310, 1550 nm

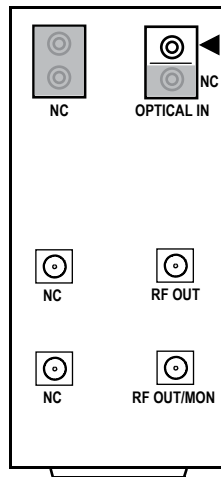
Performance
Output Return Loss (Minimum): 10 dB
Total Front-End RF Gain(1) (at minimum attenuation setting): 20 dB (dual output mode); 25 dB (single output mode)
Attenuation Adjustment Range: 15 dB
Output IP3 (at maximum gain, 25°C): 20 dB (dual output mode); 25 dB (single output mode)

1. Link RF Gain dB = TG + RG - 2*Fiber Loss dBo

9420



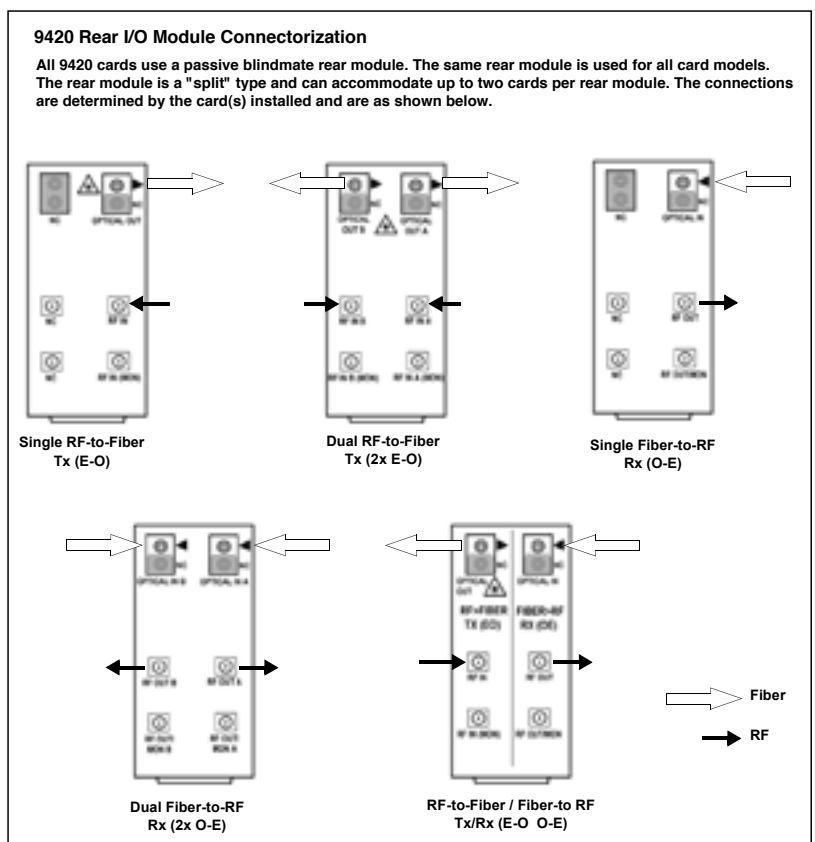
RM20-9420-LC-BNC-50
RM20-9420-LC-BNC-75
RM20-9420-SC-BNC-50
RM20-9420-SC-BNC-75



RM20-9420-LC-SMA-50
RM20-9420-SC-SMA-50

Note: Rear modules are equipped with a slot blocker preventing two Tx cards from being fitted to the same rear module. This accommodates limited per-slot power capacity for earlier frames such as the 8321. For OG3-FR and HPF-9000 frames, this blocker can be removed with no restrictions on dual-card installation for a given rear module.

Rear Modules shown are applicable for all card models. Example I/O shown here is a function of card(s) fitted to the rear module. Refer to Rear I/O Module Single and Dual-Card Tx/Rx Combinations for depictions of various I/O complements.



ORDERING INFORMATION

Note: Dual Tx installation for a rear module (two adjacent slots served by a shared rear module) is not compatible using limited-power frame such as the 8321. This frame can only accommodate one Tx, one Rx, or two Rx cards per rear module/slot pair. This restriction does not apply if using an HPF-9000 or OG3-FR frame.

9420-LT13 L-Band (850 MHz - 2.3 GHz) RF-Fiber Optic Transmitter; 1310nm DFB Tx @ +5dBm

9420-LT15 L-Band (850 MHz - 2.3 GHz) RF-Fiber Optic Transmitter; 1550nm DFB Tx @ +5dBm

9420-LR L-Band (850 MHz - 2.3 GHz) Fiber-RF Optic Receiver

9420-IFT13 IF-band (40 MHz - 1 GHz) RF-Fiber Optic Transmitter; 1310nm DFB Tx @ +5dBm

9420-IFT15 IF-band (40 MHz - 1 GHz) RF-Fiber Optic Transmitter; 1550nm DFB Tx @ +5dBm

9420-IFR IF-Band (40 MHz - 1 GHz) Fiber-RF Optic Receiver

9420-LTCWDM-XX L-Band (850 MHz - 2.3 GHz) RF-Fiber Optic Transmitter; CWDM wavelength DFB Tx @ +5dBm. Replace "XX" with desired CWDM wavelength when ordering. See table below for available CWDM wavelengths.

9420-IFTCWDM-XX L-Band (40 MHz - 1 GHz) RF-Fiber Optic Transmitter; CWDM wavelength DFB Tx @ +5dBm. Replace "XX" with desired CWDM wavelength when ordering. See table below for available CWDM wavelengths.

Note: The receiver cards listed above work with any respective L-Band or IF-Band CWDM transmitter card.

-27: 1270nm	-29: 1290nm	-33: 1330nm
-35: 1350nm	-37: 1370nm	-39: 1390nm
-41: 1410nm	-43: 1430nm	-45: 1450nm
-47: 1470nm	-49: 1490nm	-51: 1510nm
-53: 1530nm	-57: 1570nm	-59: 1590nm
-61: 1610nm		

Note: Rear I/O Modules are blindmate type and vary only in connector type and Zo as shown below. Rear I/O Module RF and fiber connection population and function is determined by card.

RM20-9420-LC-BNC-50 20-slot Frame Rear I/O Module (Standard Width; Split) 50Ω BNC, LC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-LC-BNC-75 20-slot Frame Rear I/O Module (Standard Width; Split) 75Ω BNC, LC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-LC-SMA-50 20-slot Frame Rear I/O Module (Standard Width; Split) 50Ω SMA, LC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-SC-BNC-50 20-slot Frame Rear I/O Module (Standard Width; Split) 50Ω BNC, SC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-SC-BNC-75 20-slot Frame Rear I/O Module (Standard Width; Split) 75Ω BNC, SC-APC Fiber Connectors. Supports 2 Cards.

RM20-9420-SC-SMA-50 20-slot Frame Rear I/O Module (Standard Width; Split) 50Ω SMA, SC-APC Fiber Connectors. Supports 2 Cards.

9450GT » FIBER ETHERNET SWITCH TRANSCEIVERS



The 9450GT series of fiber Ethernet switch transceivers are available in several versions providing various link length support using dual-fiber Tx/Rx. A built-in switch accommodates four Ethernet ports. Gbit ports flexibly support most communications including IP-based video/audio, control, and other data.

RJ-45 Ethernet ports provide 1Gb/s connectivity for multiple Ethernet enabled devices or links to additional network switches. A dual-fiber optical port provides an Ethernet link over a dual fiber connection for extended distances (available in 20km, 40km, and 80km link-length versions). CWDM models are available with 16 wavelength divisions, allowing 64 discrete Ethernet ports to be muxed onto a single fiber pair.

» FEATURES

Four independent copper Gigabit Ethernet ports supporting DHCP, ARP, Multicast/Broadcast

Dual LC Optical Connection. Blindmate connections with no active components on rear I/O module.

Low-power, high-density design; <8 Watts

Internal GigE midplane connection

CWDM models available in 16 different wavelength divisions, offering up to 64 channels of discrete Ethernet port muxing

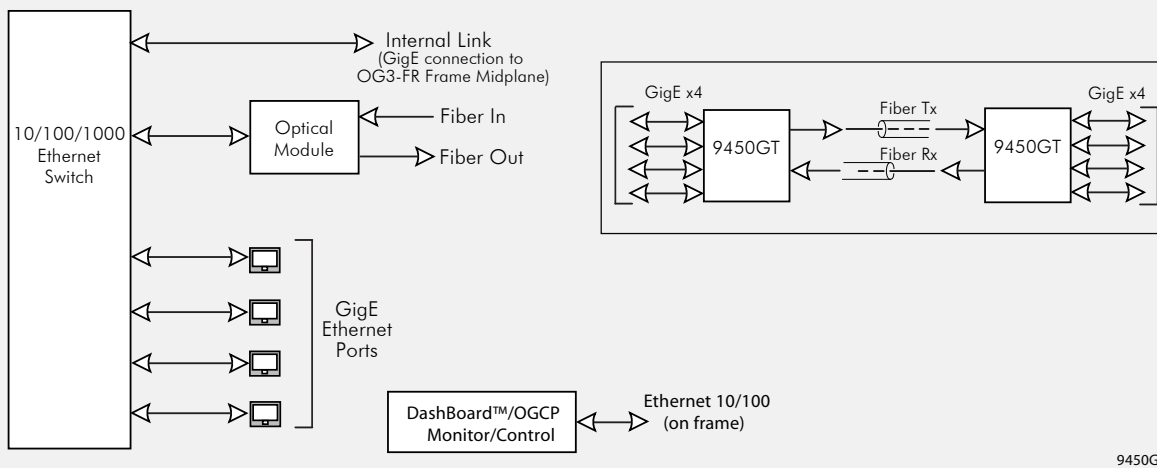
SNMP compliant

Available in 20km, 40km, and 80km versions using LC-terminated fiber

- 9450GT-20KM-LC - 20km link length
- 9450GT-40KM-LC - 40km link length
- 9450GT-80KM-LC - 80km link length
- 9450GT-CWDM - see Ordering Information

Remote control/monitoring via Dashboard™ software

Five year warranty



9450GT

9450GT

SPECIFICATIONS

Power

7 Watts

Optical

Number of inputs/outputs: 1

Nominal Wavelength: 1310nm (9450GT-20KM, 9450GT-40KM)
1550 (9450GT-80KM)

Tx Power:

- 3dBm to -8dBm (9450GT-20KM)
- +3dBm to -2dBm (9450GT-40KM)
- +5dBm to 0dBm (9450GT-80KM, 9450GT-CWDM-XX-LC)
- +7dBm to +2dBm (9450GT-CWDM-XXH-LC)

Rx Sensitivity:

- 3dBm to -22dBm (9450GT-20KM)
- 3dBm to -24dBm (9450GT-40KM, 9450GT-80KM, 9450GT-CWDM-XX-LC)
- 10dBm to -32dBm (9450GT-CWDM-XXH-LC)

Optical Budget:

- 14 dB (9450GT-20KM)
- 22 dB (9450GT-40KM)
- 24 dB (9450GT-80KM, 9450GT-CWDM-XX-LC)
- 34 dB (9450GT-80KM, 9450GT-CWDM-XXH-LC)

Receiver Overload: values above -3dB; -10dBm (9450GT-CWDM-XXH-LC)

Connector Type: Single Mode LC/UPC

Ethernet

Number of Ports: 4

Cable Type: Standard straight-thru CAT-5e

Connector Type: RJ-45

ORDERING INFORMATION

9450GT-20KM-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 20km, 1310nm Tx/Rx. Includes Rear I/O Module (LC connectors only)

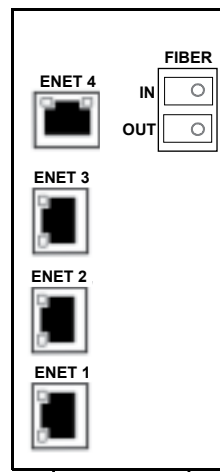
9450GT-40KM-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 40km, 1310nm Tx/Rx. Includes Rear I/O Module (LC connectors only)

9450GT-80KM-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 80km, 1550nm Tx/Rx. Includes Rear I/O Module (LC connectors only)

9450GT-CWDM-XX-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 20km, CWDM Tx/Rx. Includes Rear I/O Module (LC connectors only). Replace "XX" with desired CWDM wavelength when ordering. See table below for available CWDM wavelengths.

9450GT-CWDM-XXH-LC Single-Link Ethernet/Fiber Transceiver. Dual-Fiber 20km, CWDM Tx/Rx with high-sensitivity Rx. Includes Rear I/O Module (LC connectors only). Replace "XX" with desired CWDM wavelength when ordering. See table below for available CWDM wavelengths.

- | | | |
|--------------|--------------|--------------|
| - 27: 1270nm | - 29: 1290nm | - 31: 1310nm |
| - 33: 1330nm | - 35: 1350nm | - 37: 1370nm |
| - 43: 1430nm | - 45: 1450nm | - 47: 1470nm |
| - 49: 1490nm | - 51: 1510nm | - 53: 1530nm |
| - 55: 1550nm | - 57: 1570nm | - 59: 1590nm |
| - 61: 1610nm | | |



RM20-9450GT-B

9490CWDM » MULTI-CHANNEL FIBER OPTICAL MULTIPLEXERS AND DE-MULTIPLEXERS



The 9490 series of CWDM passive multiplexers (mux) and de-multiplexers (demux) offer a flexible, cost-effective solution to mux and demux up to eight fiber channels onto a shared fiber trunk. Used in conjunction with our fiber EO and OE converter cards, digital video, audio, and IP can all be carried over a shared fiber trunk. Coarse Wave Division Multiplexing (CWDM) offers a cost-effective, scalable, and convenient solution for multiplexing and de-multiplexing discrete channels onto a shared fiber trunk.

The 9490CWDM mux units and companion de-mux units are available in 4 and 8-channel versions. Both 8 and 4-channel versions are available with expansion ports that allow additional passive mux/demux units to be daisy-chained on to the shared fiber trunk. The passive devices use no frame power and are fully functional regardless of frame power or communication status. Each device occupies 2 frame slots.

» FEATURES

Modular, scalable design allows expansion from 4 to 16 wavelengths (channels)

Bi-directional operation

Fully passive design using low-loss filters. Requires no frame power or communications.

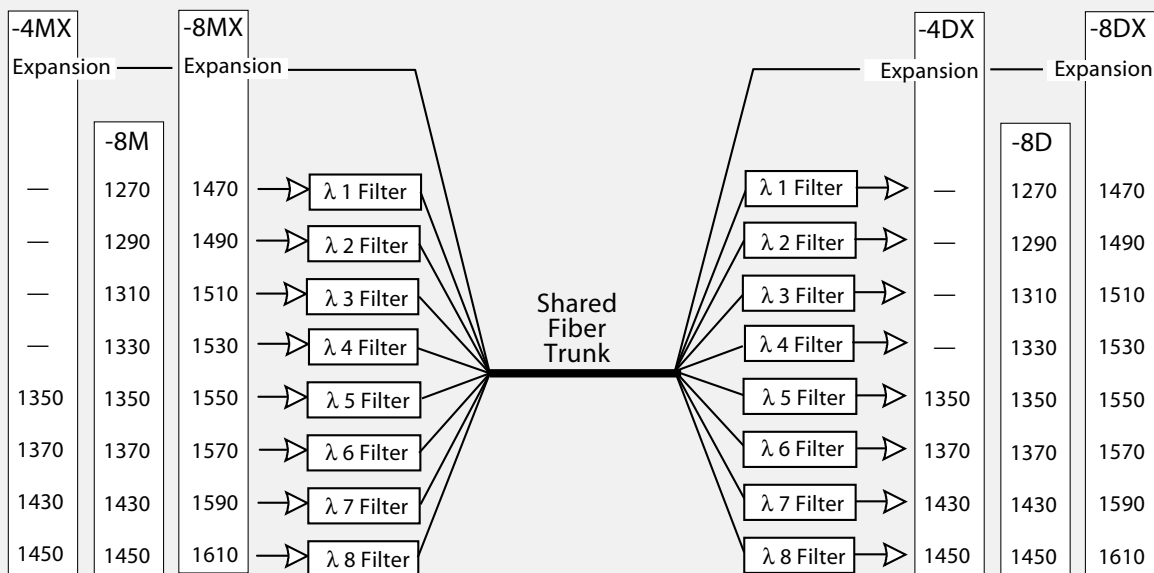
Supports single-mode fiber

Fits 20-slot openGear frames using blindmate-connection rear I/O modules

Five year warranty

9490CWDM Mux

9490CWDM De-Mux



9490CWDM-8MX 8-channel mux w/ expansion port
9490CWDM-8M 8-channel mux
9490CWDM-4MX 4-channel mux w/ expansion port

9490CWDM-8DX 8-channel demux w/ expansion port
9490CWDM-8D 8-channel demux
9490CWDM-4DX 4-channel demux w/ expansion port

9490CWDM

SPECIFICATIONS

Filter Wavelengths

See Ordering Information

Insertion Loss

3.1 dB (max) per channel (mux or demux)
3.0 dB (max) (expansion port; mux or demux)

Adjacent Channel Isolation

30 dB (min)

Non-Adjacent Channel Isolation

40 dB (min)

Passband Ripple

0.3 dB

Channel Passband

+/- 6.5 nm

Channel Spacing

20 nm

Return Loss

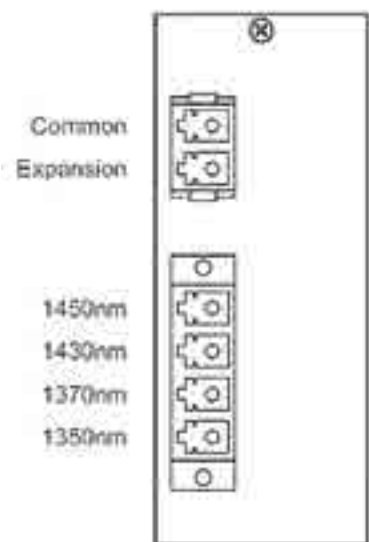
50 dB (min)

Frame Slot Usage

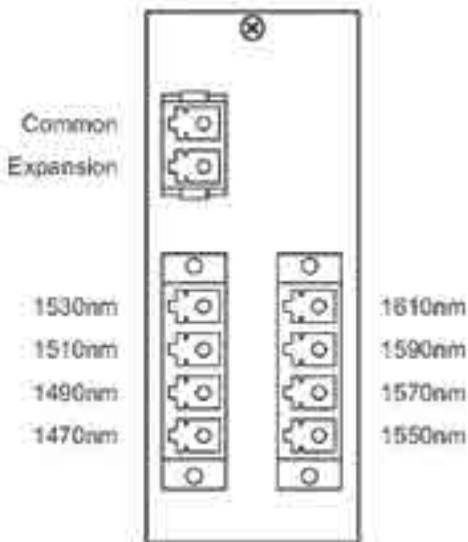
2 per unit

Connector Type

Type LC



**9490CWDM-4MX-LC / 9490CWDM-4DX-LC
REAR MODULE CONNECTIONS (TYPICAL)**



**9490CWDM-8MX-LC / 9490CWDM-8DX-LC
REAR MODULE CONNECTIONS (TYPICAL)**

Note: Depending on model, wavelength designations for the mux/demux ports may vary from those shown here. Refer to label on rear module for wavelength designations.

ORDERING INFORMATION

9490CWDM-4MX-LC 4-Channel Optical Mux with expansion port; 1350nm - 1370nm - 1430nm - 1450nm. Includes type LC connector Rear I/O Module

9490CWDM-8MX-LC 8-Channel Optical Mux with expansion port; 1470nm - 1490nm - 1510nm - 1530nm - 1550nm - 1570nm - 1590nm - 1610nm. Includes type LC connector Rear I/O Module

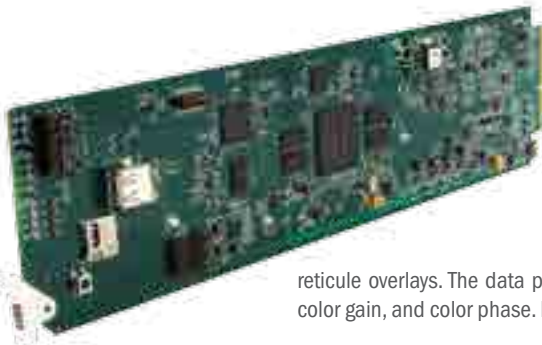
9490CWDM-8M-LC 8-Channel Optical Mux; 1270nm - 1290nm - 1310nm - 1330nm - 1350nm - 1370nm - 1430nm - 1450nm. Includes type LC connector Rear I/O Module

9490CWDM-4DX-LC 4-Channel Optical De-Mux with expansion port; 1350nm - 1370nm - 1430nm - 1450nm. Includes type LC connector Rear I/O Module

9490CWDM-8DX-LC 8-Channel Optical De-Mux with expansion port; 1470nm - 1490nm - 1510nm - 1530nm - 1550nm - 1570nm - 1590nm - 1610nm. Includes type LC connector Rear I/O Module

9490CWDM-8D-LC 8-Channel Optical De-Mux; 1270nm - 1290nm - 1310nm - 1330nm - 1350nm - 1370nm - 1430nm - 1450nm. Includes type LC connector Rear I/O Module

9501-DCDA-3G » DOWNCONVERTER WITH 3G/HD/SD-SDI INPUT, SDI RECLOCKING, SD-SDI AND ANALOG VIDEO/AUDIO OUTPUTS/AES OUTPUTS



The 9501-DCDA-3G provides 3G/HD-to-SD down-conversion with ARC and has versatility in providing up to four SD-SDI and/or analog composite outputs as well as up to four reclocked SDI input copies. The space-saving design of the 9501-DCDA-3G provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard width “split” rear module. Up to 20 of the 9501-DCDA cards can be installed in a 20-slot frame.

The card can pass SD signals with re-aspect, if needed. Analog audio outputs can be de-embedded from selected embedded audio channels. The 9501-DCDA can rate-convert 23.98 frame video to 59.94 fields, move progressive to interlace and is equipped with extensive user programmable reticule overlays. The data path is 10-bit with 12-bit analog encoding. Full proc control allows adjustment of luma gain, luma lift, color gain, and color phase. Preset save/load allows saving custom card settings while allowing one-button revert to factory settings.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. Full user Dashboard™ or Remote Control Panel remote control allows full card status and control access locally or across a standard Ethernet network.

9501-DCDA Options

- LTC In/Out Software Option (+LTC)
- 3G Upgrade for -HD model Software Option (+3G)
- Framesync Software Option (+FS)
- Color Correction Software Option (+COLOR)



Alternate Base Model

- 9501-DCDA-HD Downconverter/DA with HD/SD-SDI Input, SDI Reclocking, SD-SDI and Analog Video/Audio Outputs

» FEATURES

Low power/high-density design allows up to 20 cards per frame; less than 18 Watts per card

Built-in x4 DAs for both reclocked and processed outputs

Dual SDI inputs with manual GUI select and basic failover function

Economical solution for 3G down-conversion to legacy SD monitoring systems

Auto-format detect/down-conversion of SMPTE 425/292/259M formats

Full timecode and CEA 708 / CEA 608 conversion to SD VITC-based timecode and closed-captioning. Option +LTC allows bidirectional transfer and conversion between embedded video timecode formats and audio LTC. Audio LTC can be received or sent via embedded audio channels. Video embedded timecode formats can be converted to audio LTC and sent over embedded or analog audio output channels.

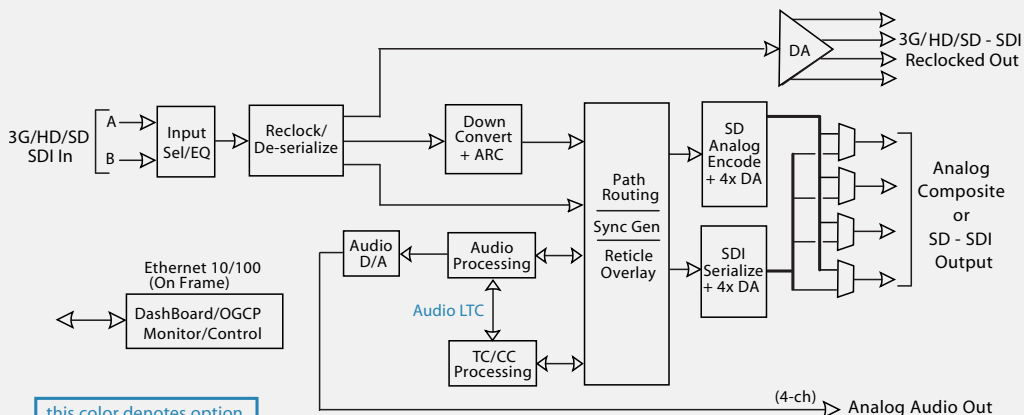
Color framing preserved on CVBS outputs for all conversions

GUI-based output selector allows flexible SDI or CVBS outputs on four processed-output BNCs

Full embedded audio control with selectable downmix and analog audio de-embed

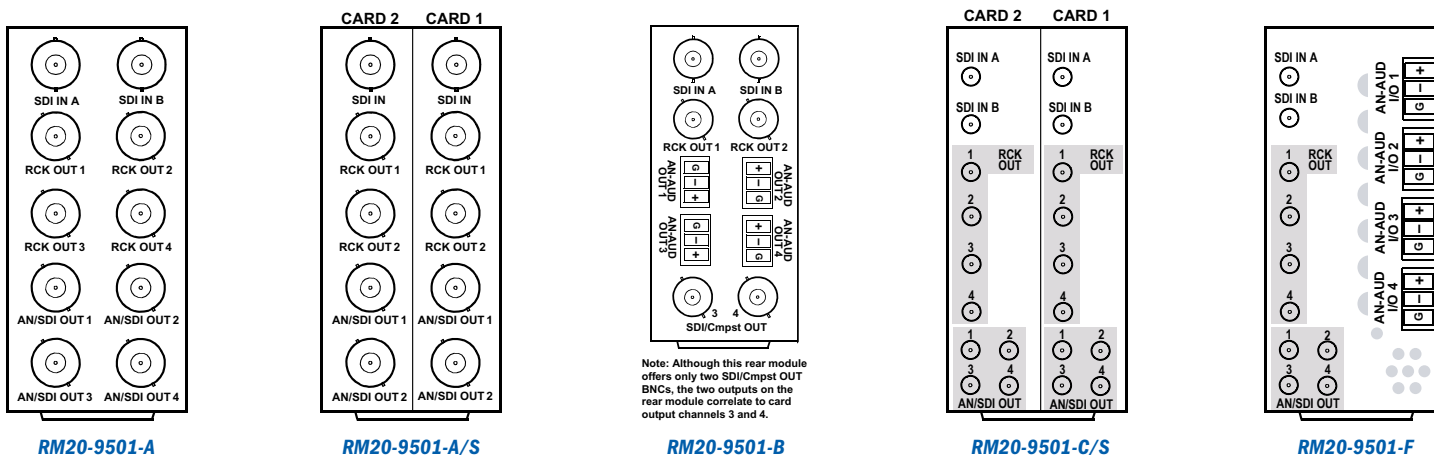
Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five-year warranty



9501-DCDA

9501-DCDA-3G



SPECIFICATIONS

Power

<18 Watts

HD/SD-SDI Input

Number of Inputs: (2) 3G/HD/SD-SDI BNCs. GUI-selectable.

Standards: SMPTE 259M, 292, 425

Supported Formats: 1080p59.94,50,29.97, 24, 23.98, 1080i59.94,50, 625i, 525i

Return Loss: 15 dB up to 1.485 GHz
10 dB up to 2.970 GHz

Video Outputs

Number of Outputs: 4 dedicated relocked output BNCs. Up to 4 processed SD-SDI (or CVBS output) BNCs. GUI-selectable.

SDI Signal Level: 800 mV nominal

SDI Return Loss: >15 dB up to 1.485 GHz
>10 dB up to 2.970 GHz

SDI Jitter: SD: < 0.2 UI

SDI Embedded Audio: 16-Ch

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)

Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Analog Audio Output

Number of Outputs: 4-Ch (max) balanced using 3-wire Phoenix connectors

Maximum Output Level: +24 dBu @ 0 dBFS

DAC Resolution: 24-bit

ORDERING INFORMATION

9501-DCDA Downconverter with 3G/HD/SD-SDI Input, SDI Reclocking, SD-SDI and Analog Video/Audio Outputs

RM20-9501-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Reclocked Output BNCs, (4) Output BNCs (GUI-selectable as SD-SDI and/or Analog CVBS)

RM20-9501-A/S 20-Slot Frame Rear I/O Module (Split) 3G/HD/SD-SDI Input BNC, (2) HD/SD-SDI Reclocked Output BNCs, (2) Output BNCs (GUI-selectable as SD-SDI and/or Analog CVBS) (inputs/outputs listed are per card)

RM20-9501-B 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Reclocked Output BNCs, (2) Output BNCs (GUI-selectable as SD-SDI and/or Analog CVBS), (4) Analog Audio Outputs

RM20-9501-C/S-DIN 20-Slot Frame Rear I/O Module (Split, Hi-Density) (2) 3G/HD/SD-SDI Input BNCs, (4) HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS) (inputs/outputs listed are per card; all connectors DIN1.0/2.3)

RM20-9501-C/S-HDBNC 20-Slot Frame Rear I/O Module (Split, Hi-Density) (2) 3G/HD/SD-SDI Input BNCs, (4) HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS) (inputs/outputs listed are per card; all connectors HD-BNC)

RM20-9501-F-DIN 20-Slot Frame Rear I/O Module (Standard Width, Hi-Density) (2) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS), (4) Analog Audio Outputs (all coaxial connectors DIN1.0/2.3)

RM20-9501-F-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, Hi-Density) (2) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Reclocked Outputs, (4) Outputs (GUI-selectable as SD-SDI and/or Analog CVBS), (4) Analog Audio Outputs (all coaxial connectors HD-BNC)

+3G Software license upgrade for 9501-DCDA-HD card. Upgrades card to 9501-DCDA-3G functionality/specifications.

+COLOR Color Correction Software Option

+FS Framesync Software Option

+LTC Audio LTC Option

9502-DCDA-3G » DOWNCONVERTER WITH 3G/HD/SD-SDI INPUT, HD/SD-SDI PROCESSED OUTPUTS, AND SDI INPUT RECLOCKING



The 9502-DCDA provides 3G/HD-to-SD down-conversion with ARC and has versatility in providing up to four HD/SD-SDI processed outputs as well as up to four reclocked SDI input copies selectable from two SDI inputs. The space-saving design of the 9502-DCDA provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard width “split” rear module. Up to 20 of the 9502-DCDA cards can be installed in a 20-slot frame.

The card can pass SD signals with re-aspect, if needed. AES audio outputs can be de-embedded from selected embedded audio channels. Using a 10-bit video path, the 9502-DCDA can re-convert 23.98 frame video to 59.94 fields, move progressive to interlace and is equipped with extensive user programmable reticule overlays. Full proc control allows adjustment of white level, black level, color gain, and color phase. Factory presets enable a return to factory settings. The 9502 offers 3G down-conversion to 1080i, 720p, or SD-SDI.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. Full user DashBoard™ or Remote Control Panel remote control (and card-edge monitor/control) allows full card status and control access locally or across a standard Ethernet network.

9502-DCDA Options

- LTC In/Out Software Option (+LTC)
- 3G Upgrade for -HD model Software Option (+3G)
- Framesync Software Option (+FS)
- Color Correction Software Option (+COLOR)



Alternate Base Model

- 9502-DCDA-HD Downconverter/DA with HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking

» FEATURES

Low power/high-density design allows up to 20 cards per frame; less than 18 Watts per card

Economical solution for 3G downconversion to legacy SD monitoring systems

Auto-format detect/down-conversion of SMPTE 425/292/259M formats

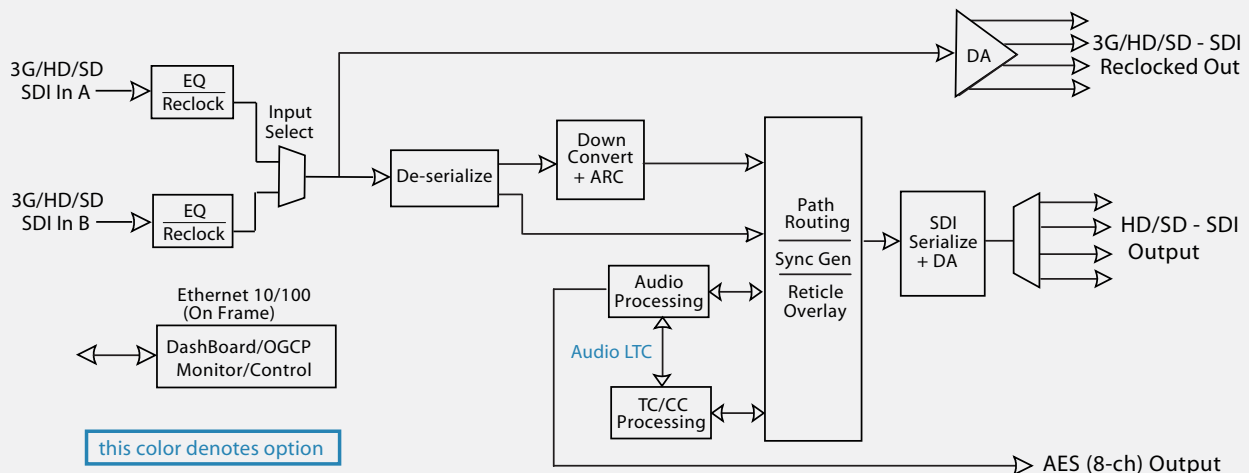
Full timecode and CEA 708 / CEA 608 conversion to SD VITC-based timecode and closed-captioning. Option +LTC allows bidirectional transfer and conversion between embedded video timecode formats and audio LTC. Audio LTC can be received or sent via embedded audio channels. Video embedded timecode formats can be converted to audio LTC and sent over embedded audio output channels.

GUI-based output crosspoint allows flexible processed or reclocked outputs

Full embedded audio processing with selectable downmix and AES audio de-embed. Dolby passthru on downconversions.

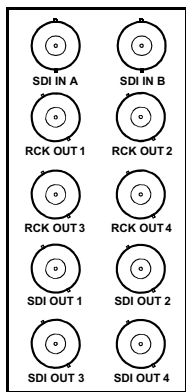
Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panels

Five-year warranty

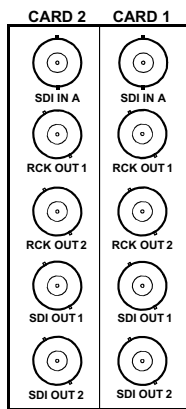


9502-DCDA

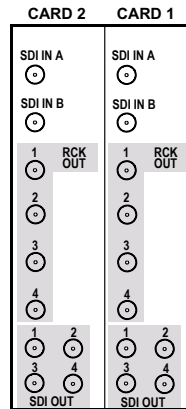
9502-DCDA-3G



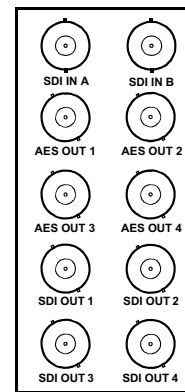
RM20-9502-A



RM20-9502-A/S



RM20-9502-C/S



RM20-9502-F

SPECIFICATIONS

Power

<18 Watts

HD/SD-SDI Input

Number of Inputs: 2
 Standards: SMPTE 259M, 292, 425
 Supported Formats: 1080p59.94,50,29.97,25,24,23.98
 1080i59.94,50
 625i50, 525i59.94
 Return Loss: 15 dB up to 1.485 GHz
 10 dB up to 2.970 GHz

Video Outputs

Number of Outputs: 4 dedicated relocked output BNCs
 Up to 4 processed HD/SD-SDI
 SDI Signal Level: 800 mV nominal
 SDI Return Loss: >15 dB up to 1.485 GHz
 >10 dB up to 2.970 GHz
 SDI Jitter: SD: < 0.2 UI
 SDI Embedded Audio: 16-Ch

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
 Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

AES Output

Number of Outputs: 8-Ch (max) unbalanced (AES-3id)
 Impedance: 75 Ω
 Sample Rate: 48 kHz
 Resolution: 24-bit

ORDERING INFORMATION

9502-DCDA-3G Downconverter with 3G/HD/SD-SDI Input, SDI Reclocking, SD-SDI and Analog Video/Audio Outputs

9502-DCDA Downconverter with 3G/HD/SD-SDI Input, HD/SD-SDI Processed Outputs, and SDI Input Reclocking

RM20-9502-A 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Reclocked Output BNCs, (4) HD/SD-SDI Processed Output BNCs

RM20-9502-A/S 20-Slot Frame Rear I/O Module (Split) 3G/HD/SD-SDI Input BNC, (2) HD/SD-SDI Reclocked Output BNCs, (2) HD/SD-SDI Processed Output BNCs (inputs/outputs listed are per card)

RM20-9502-C/S-DIN 20-Slot Frame Rear I/O Module (Split, High-Density) (2) 3G/HD/SD-SDI Inputs, (4) HD/SD-SDI Reclocked Outputs, (4) HD/SD-SDI Processed Outputs (inputs/outputs listed are per card; all connectors DIN1.0/2.3)

RM20-9502-C/S-HDBNC 20-Slot Frame Rear I/O Module (Split, High-Density) (2) 3G/HD/SD-SDI Inputs, (4) HD/SD-SDI Reclocked Outputs, (4) HD/SD-SDI Processed Outputs (inputs/outputs listed are per card; all connectors HD-BNC)

RM20-9502-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (4) Video HD/SD-SDI Processed Output BNCs, (4) AES Audio Output BNCs

+3G Software license upgrade for 9502-DCDA-HD card. Upgrades card to 9502-DCDA-3G functionality/specifications.

+COLOR Color Correction Software Option

+FS Framesync Software Option

+LTC Audio LTC Option



9902-DC-4K » UHDTV QUADRANT COMBINING DOWNCONVERTER



New for 2014, the 9902-DC-4K UHDTV Quadrant Combining Downconverter provides an easily integrated openGear® solution for converting 4K quadrant-division content into 3G/HD/SD-SDI. Easy to use DashBoard configuration and monitor provides for easy setup.

The 9902-DC-4K precisely combines the four quadrant-divided individual SDI feeds into a combined SDI image directly suitable for broadcast production usage or monitoring purposes. The combined SDI output can be scaled to 3G/HD/SD-SDI. An HDMI output is also furnished which is directly usable by a monitor. The openGear® card-based form-factor and high-density design allows up to 10, 9902-DC-4K cards to be fitted to a 20-slot frame. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network.

» FEATURES

Scalable solution for 4K UHDTV quadrant-division down-conversion/integration to SDI for cinema and sports production

openGear® card-based form factor provides easy, compact, and economical integration

Input crosspoint allows quadrant inputs to be easily re-arranged without changing connections

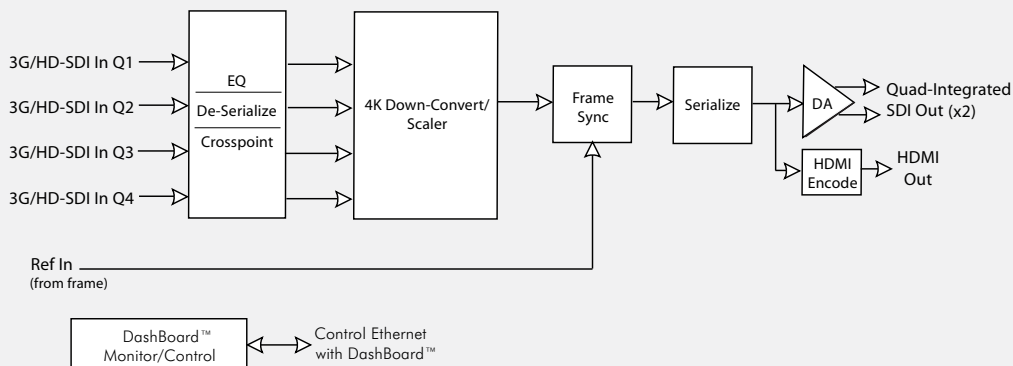
Flexible downconvert output provides 3G/HD/SD-SDI output

Low-power/high-density design - less than 18 Watts per card

HDMI output allows direct feed to monitors

DashBoard™ remote control status monitoring and setup/control

Five year warranty



9902-DC-4K

» SPECIFICATIONS

Power

< 18 Watts

Video Input/Outputs

Video Inputs: (4) 3G/HD/SD-SDI 75Ω BNC

SDI Output: (1) 3G/HD/SD-SDI 75Ω BNC

HDMI Output: (1) HDMI output

Formats Supported

SMPTE 259M, SMPTE 292M, SMPTE 424M

Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

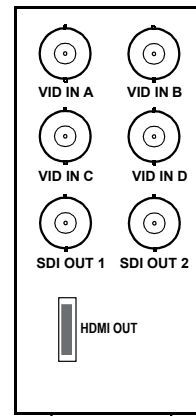
Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

» ORDERING INFORMATION

9902-DC-4K UHDTV Quadrant Combining Downconverter

RM20-9902DC4K-B 20-Slot Frame Rear I/O Module (Standard Width) (4) Quadrant-division 3G/HD/SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs (2x DA), (1) HDMI Output



RM20-9902DC4K-B



9061 » UP/DOWN/CROSS CONVERTER

with Analog/SDI Input, Audio Embed/De-Embed, Frame Sync, Timecode and Closed Caption Support

OPTIONS

Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC)



The 9061 offers full-feature HD/SD format conversion (including analog-to-digital conversions using 12-bit conversion depth), HD/SD-SDI and analog video inputs, video processing, full audio embed/de-embed, crosspoint, and level control (with analog and AES discrete audio inputs), and frame sync with video/audio offset.

The 9061 additionally provides AFD functions that detect the incoming AFD code, allow independent custom ARC to be applied for each incoming AFD code, and set the desired AFD code to be inserted on the output, even if there is no code detected on the input. Closed captions and timecode are preserved through up, down, and cross conversions. 708/608 CC data is extracted from the SDI stream and converted to line 21 data on a down-conversion, and inserted into the SDI stream on an up-conversion. The 9061 features full user remote and card-edge processing control with user memory that allows adjustment of white level, black level, color gain, color phase, audio levels, audio routing, frame sync, and many other controls. Factory presets enable a return to factory settings.

» FEATURES

HD/SD universal analog and digital inputs

Differential analog video inputs for power hum rejection

5-line adaptive comb filter for SD-Composite mode

Up, down, cross and aspect ratio conversion

3:2 pulldown and reverse 3:2 pulldown conversion Detail enhancement and noise reduction

Selectable safe action, safe title, and center cross overlays

Timecode insertion/conversion from SDI input and analog video input sources. +LTC option allows LTC input/output on shared port, with bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.

Analog and AES audio inputs and AES output

24-bit audio embedding and de-embedding

Audio channel mapping, down-mixing, and level control

24-bit analog audio conversion

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding

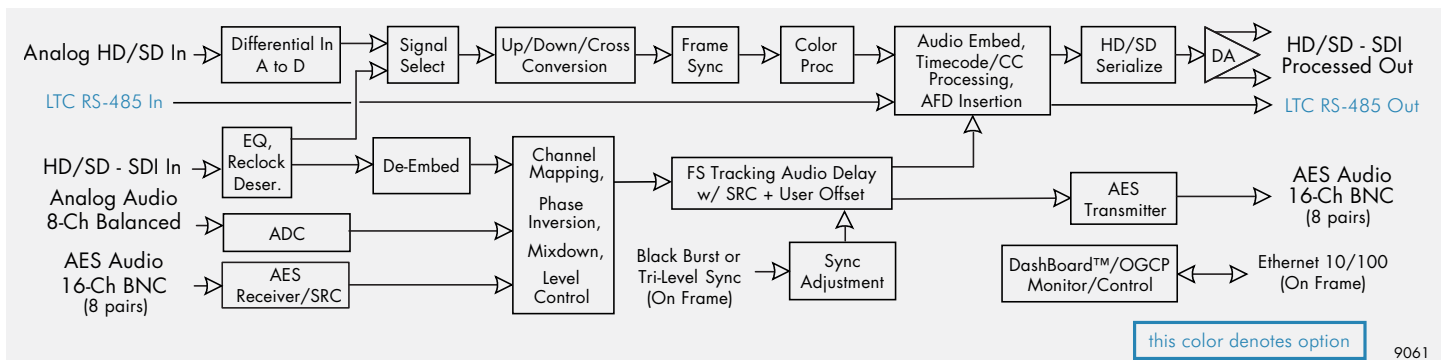
AFD code insertion/AFD ARC Control

Audio offset adjustment for lip-sync alignment Frame sync with up to 13 frames of user adjustable delay HD/SD closed captioning support and flexible timecode processing

Remote control/monitoring via Dashboard™ software or OGCP-9000 control panel

16 user presets

Five-year warranty



» ORDERING INFORMATION

9061 Up/Down/Cross Converter with Analog/SDI Input, Audio Embed/De-Embed, Frame Sync, Timecode, Closed Caption Support

RM20-9061-A 20-Slot Frame Rear I/O Module (Standard Width) Analog and Digital Video Input, 4 AES In/Out BNCs, and 2 SDI Output BNCs

RM20-9061-B 20-Slot Frame Rear I/O Module (Standard Width) Analog and Digital Video Input, 4 Analog Audio Inputs, and 2 SDI Output BNCs

RM20-9061-C 20-Slot Frame Rear I/O Module (Double Width) Analog and Digital Video Input, 2 AES In BNCs, 4 AES In/Out BNCs, 8 Analog Audio Inputs, and 2 SDI Output BNCs

RM20-9061-D 20-Slot Frame Rear I/O Module (Double Width) Digital Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 8 AES Out BNCs, and 2 SDI Output BNCs

RM20-9061-E 20-Slot Frame Rear I/O Module (Double Width) Analog and Digital Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 6 AES Out BNCs, and 2 SDI Output BNCs

RM20-9061-F 20-Slot Frame Rear I/O Module (Double Width) Analog and Digital Video In, 4 AES In/Out BNCs, 8 Analog Audio In, RS-485 LTC / Metadata I/O Port, and 2 SDI Output BNCs

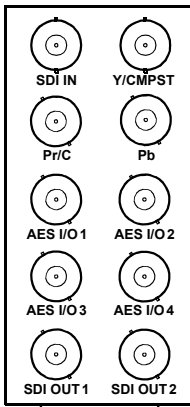
RM20-9061-G 20-Slot Frame Rear I/O Module (Triple Width) Analog and Digital Video In, 8 AES In BNCs, 8 AES Out BNCs, 8 Analog Audio In, and 2 SDI Output BNCs

RM20-9061-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) Analog and Digital Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors HD-BNC)

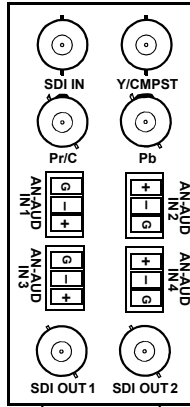
RM20-9061-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) Analog and Digital Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors DIN1.0/2.3)



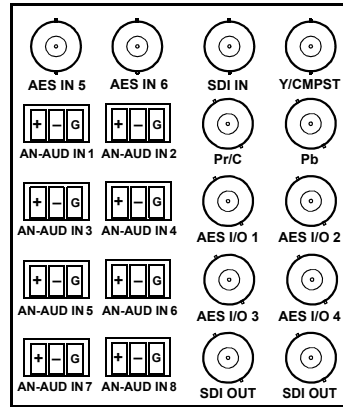
9061



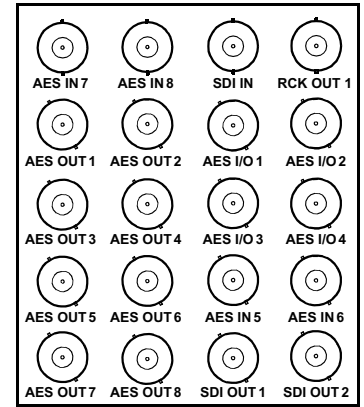
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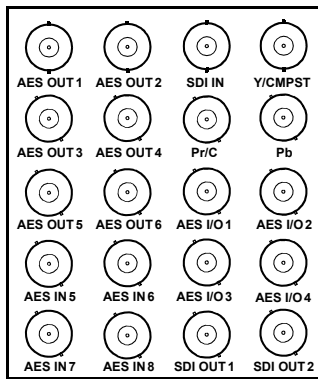
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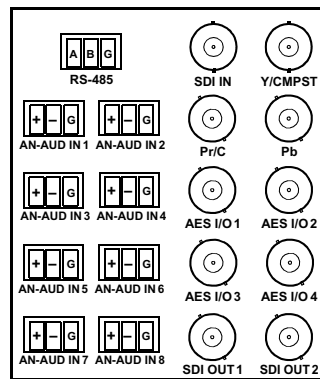
RM20-9061-C



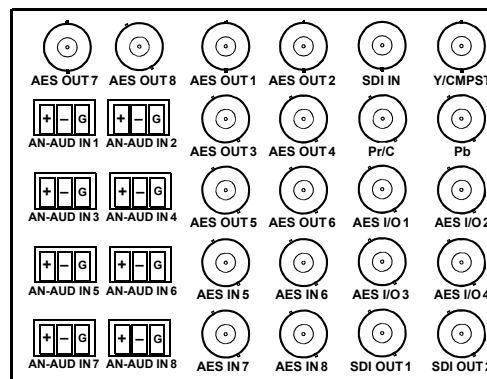
RM20-9061-D



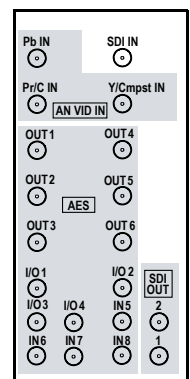
RM20-9061-E



RM20-9061-F



RM20-9061-G



RM20-9061-E-DIN-HDBNC

SPECIFICATIONS

Electrical

Power: 23 watts

HD/SD-SDI Input

Number of Inputs: 1
Standard: SMPTE 292 and 259M
Return Loss: >15 dB at 5 MHz - 1.485 GHz

Analog Video Input

HD Standard: YPbPr or RGB SMPTE
SD Standard: Composite, Y/C or Component (YPbPr BetaCam™, MII™ or SMPTE/N10)
Impedance: 75 Ω

AES Input

Number of Inputs: 16-Ch unbalanced BNC (nominal 48 kHz only)
Impedance: 75 Ω
Input Level: 0.1 V to 2.5 V p-p (5 V p-p tolerant)
Resolution: 24-bit

Analog Audio Input

Number of Inputs: 8-Ch balanced
Connector: Removable 3-pin Phoenix
Signal Level: up to +24 dBu
Sample Rate: 48 kHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Processing

A/D Conversion: HD: 4:4:4 SD: 8:8:8
Quantization: 12-bit A to D and 10-bit video data path
SD Comb Filter: 5-line adaptive

AES Output

Number of Outputs: 16-Ch unbalanced BNC
Impedance: 75 Ω
Sample Rate: 48 kHz
Resolution: 24-bit

HD/SD-SDI Output

Number of Outputs: 2
Standard: SMPTE 292 and 259M
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 270 MHz
>12 dB at 270 MHz - 1.485 GHz
Jitter: HD: < 0.15 UI
SD: < 0.10 UI
Embedded Audio: 16-Ch SD/HD

Note: This card uses a daughtercard mounted on the card right-side (viewed from front). As such, this card cannot be installed in Slot 20 of a 20-slot frame (the card must be installed in even-numbered slots 2 through 18). Please note this when fitting out a frame using this card.

9062 » UP/DOWN/CROSS CONVERTER

with HD/SD-SDI Input, Embedded Audio, Frame Sync, Timecode and Closed Caption Support

OPTIONS

Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic™ Upmixing (+UM), LTC In/Out (+LTC)

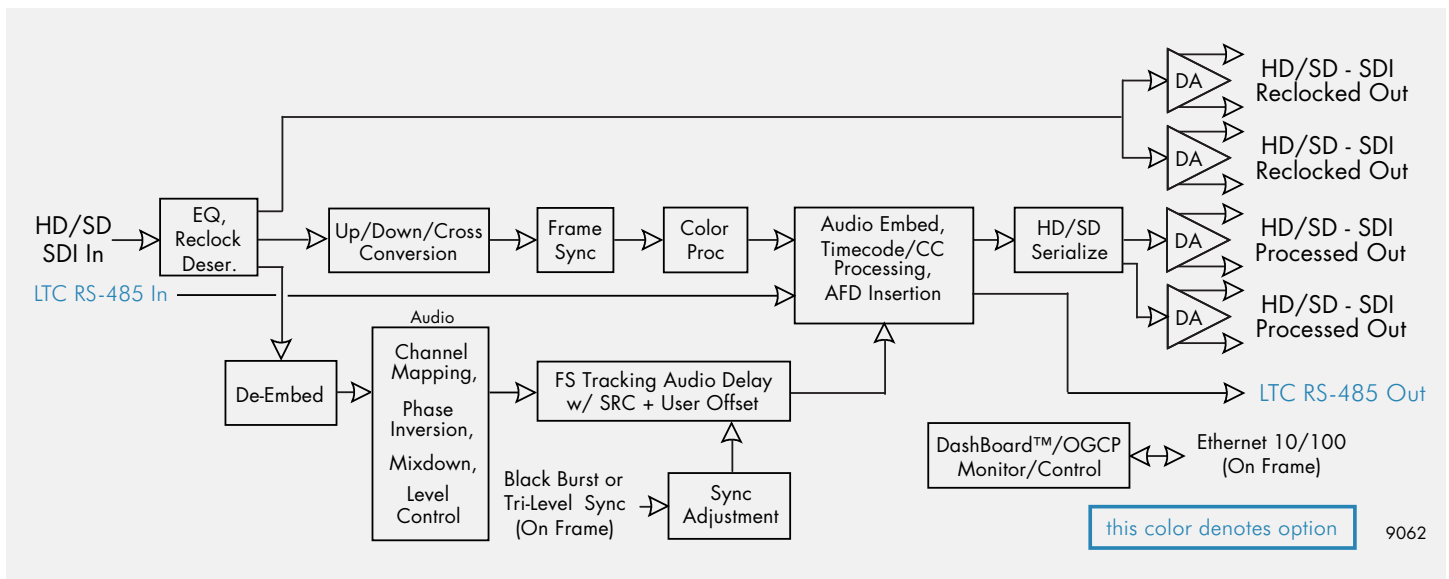


The 9062 offers full-feature HD/SD format conversion, an HD/SD-SDI input, video processing, embedded audio crosspoint and level control, and frame sync with video/audio offset.

The 9062 additionally provides AFD functions that detect the incoming AFD code, allow independent custom ARC to be applied for each incoming AFD code, and set the desired AFD code to be inserted on the output, even if there is no code detected on the input. Closed captions and timecode are preserved through up, down, and cross conversions. 708/608 CC data is extracted from the transport stream, converted to line 21 data on a downconversion, and inserted into the transport stream on an upconversion. The 9062 features full user remote and card-edge processing control with user memory that allows adjustment of white level, black level, color gain, color phase, audio levels, audio routing, frame sync, and many other controls. Factory presets enable a return to factory settings.

» FEATURES

HD/SD digital inputs	Frame sync with up to 13 frames of user adjustable delay	Audio channel mapping, downmixing, and level control	Detail enhancement and noise reduction
HD/SD closed captioning support and flexible timecode processing	Timecode insertion/conversion. +LTC option allows LTC input/output on shared port, with bi-directional conversion between VBI and LTC on RS-485 or embedded audio I/O.	3:2 pulldown and reverse 3:2 pulldown conversion	Five-year warranty
Up, down, cross and aspect ratio conversion	Embedded audio offset adjustment for lip-sync alignment	16 user presets	
AFD code insertion/AFD ARC Control		Remote control/monitoring via Dashboard™ software or OGCP-9000 control panel	
Selectable safe action, safe title, and center cross overlays			



» ORDERING INFORMATION

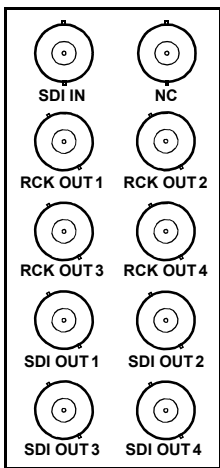
9062 Up/Down/Cross Converter with HD/SD-SDI Input, Embedded Audio, Frame Sync, Timecode and Closed Caption Support

RM20-9062-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs

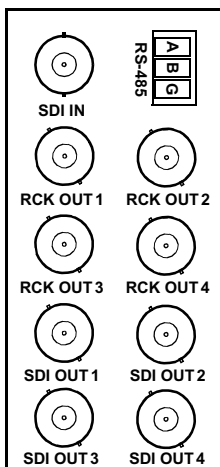
RM20-9062-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs, RS-485 LTC / Metadata I/O Port



9062



RM20-9062-A



RM20-9062-B

» FORMAT CONVERTERS	9061	9062	9064	9066	9067	9068	9821	9822
SDI Inputs	1	1	1	1	1	1	1	1
SDI Processed Outputs	2	4	4	2	4	4	4	4
SDI Input Copies	0	4	4	0	4	4	4	4
Analog Video Input	.			.				
Analog Video Output							.	
Analog Audio Input	.			.				
Analog Audio Output							.	
Remote Control & Monitoring	.	.	.	.	.	.	.	.
SNMP	.	.	.	.	.	.	.	.
AES Embedding	.			.				
AES De-Embedding	.			.				
Frame Sync	.	.	.	.	.			.
Upconversion	.	.	.	.	.	.
Downconversion	.	.	.				.	.
Cross Conversion	.	.	.					
HD <-> SD Closed Captioning	.	.	.	.	.	.	.	.
HD <-> SD Timecode Conversion	.	.	.	.	.	.	.	.
HD <-> SD Emb Audio Conversion	.	.		.	.	.	.	.
Embedded Audio Delay	.	.		.	.			.
Adjustable Video Delay	.	.		.	.			.
AFD ARC Control	.	.	.	.	.	.		.
AFD Code Insertion	.	.	.	.	.	.		.
Audio Downmixing	.	.		.	.			.
Color Correction			.					

» SPECIFICATIONS

Electrical

Power: 18 watts

HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 292 and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
 Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Processing Delay

Minimum Frame Sync Delay: < 3 lines

HD/SD-SDI Output

Number of Outputs: 4 relocked
 4 processed
 Standard: SMPTE 292 and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz
 Jitter: HD: < 0.15 UI
 SD: < 0.10 UI
 Embedded Audio: 16-Ch SD/HD

Note: This card uses a daughtercard mounted on the card right-side (viewed from front). As such, this card cannot be installed in Slot 20 of a 20-slot frame (the card must be installed in even-numbered slots 2 through 18). Please note this when fitting out a frame using this card.



9064 » UP/DOWN/CROSS CONVERTER

with HD/SD-SDI Input, RGB Color Corrector, Frame Sync



The 9064 offers full-feature HD/SD format conversion and provides RGB-space color correction with YCbCr processing features, and also provides frame sync for HD/SD-SDI video streams.

The RGB processing controls provide full offset, gain and gamma adjustments. The YCbCr processing controls provide lift, gain, saturation, phase, white clip (hard and soft), black clip, and color saturation clip. Parameter updates are smooth and responsive, providing real-time adjustments.

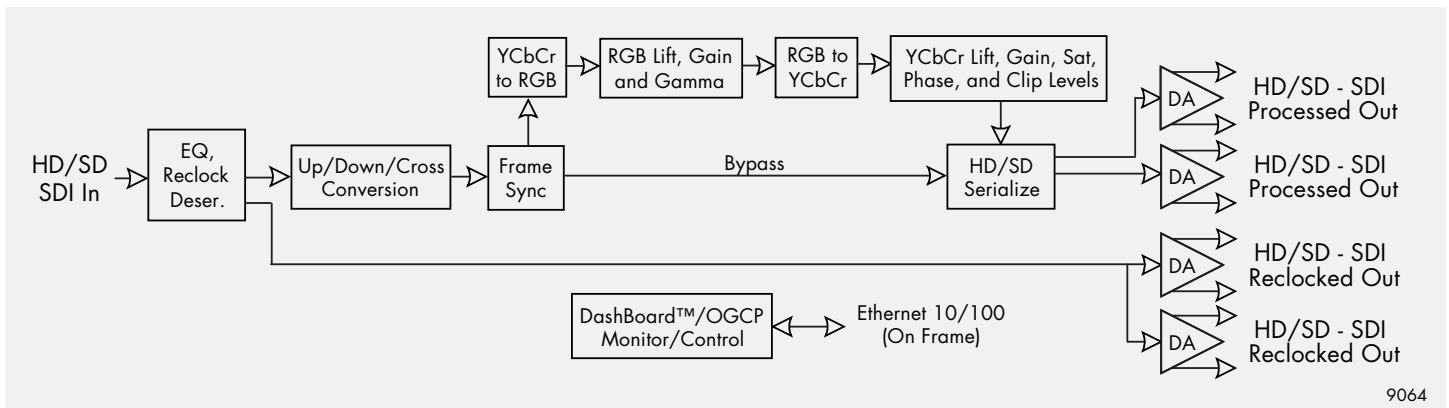
Even though the card provides extensive control of the signal from the RGB perspective, it will continue to pass those signals that fall outside of the RGB gamut. Pluge and YCbCr limit ramp signals pass without modification. When the CbCr saturation clip is activated, the saturation limiting operation will not affect the color phase.

The 9064 also includes AFD functions that detect the incoming AFD code, allow independent custom ARC to be applied for each incoming AFD code, and set the desired AFD code to be inserted on the output, even if there is no code detected on the input.

Closed captions and timecode are preserved through up, down, and cross conversions. 708/608 CC data is extracted from the transport stream and converted to line 21 data on a downconversion. On an upconversion, it is decoded from line 21 and inserted into the SDI stream on a user-selectable line.

» FEATURES

HD/SD digital inputs	Phase preserved when applying saturation clip	Parameter updates are smooth and responsive, excellent for on-air manipulation	Detail enhancement and noise reduction
Up, down, cross and aspect ratio conversion	AFD code insertion and AFD ARC Control	On-card storage of 16 presets	Frame sync with up to 13 frames of user adjustable delay
Full RGB color corrector (offset, gain, gamma)	Passes entire YCbCr gamut in unity gain configuration	Local control from full card edge menu with character display	Five-year warranty
Extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip	One button bypass of color correction for comparison purposes	Remote control/monitoring via Dashboard™ or OGCP-9000/CC remote control panel	



9064

» ORDERING INFORMATION

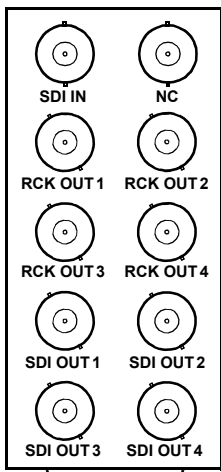
9064 Up/Down/Cross Converter with HD/SD-SDI Input, RGB Color Corrector, Frame Sync

RM20-9064-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 SDI Reclocked Outputs, 4 SDI Processed Outputs

OGCP-9000/CC 2RU Remote Control Panel for Color Correctors and all 9000 Series COMPASS® Cards (Specify country of destination for power cord)



9064



RM20-9064-A

») FORMAT CONVERTERS	9061	9062	9064	9066	9067	9068	9821
SDI Inputs	1	1	1	1	1	1	1
SDI Processed Outputs	2	4	4	2	4	4	4
SDI Input Copies	0	4	4	0	4	4	4
Analog Video Input	.			.			
Analog Video Output							.
Analog Audio Input	.			.			
Analog Audio Output							.
Remote Control & Monitoring	.	.	.	.	.	.	.
SNMP	.	.	.	.	.	.	.
AES Embedding	.			.			
AES De-Embedding	.			.			
Frame Sync	.	.	.	.	.
Upconversion	.	.	.	.	.	.
Downconversion	.	.	.				.
Cross Conversion	.	.	.				
HD <-> SD Closed Captioning	.	.	.	.	.	.	.
HD <-> SD Timecode Conversion	.	.	.	.	.	.	.
HD <-> SD Emb Audio Conversion	.	.		.	.	.	.
Embedded Audio Delay	.	.		.	.
Adjustable Video Delay	.	.		.	.
AFD ARC Control	.	.		.	.	.
AFD Code Insertion	.	.		.	.	.
Audio Downmixing	.	.		.	.
Color Correction			.				

») SPECIFICATIONS

Electrical

Power: 17 watts

HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 292 and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
 Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

HD/SD-SDI Output

Number of Outputs: 4 reclocked
 4 processed
 Standard: SMPTE 292 and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz

Jitter: HD: < 0.15 UI
 SD: < 0.10 UI
 Embedded Audio: 16-Ch SD/HD

RGB Color Correction

RGB Black Adjust (one per primary): -100% to 100% in 0.1% steps
 RGB White Adjust (one per primary): 0% to 200% in 0.1% steps
 RGB Gamma Control (one per primary): 0.125 to 8.0 in 0.001 steps

YCbCr Proc Amp

White Adjust (Gain): 0 to 200% in 0.1% steps
 Black Adjust (Lift): -100% to 100% in 0.1% steps
 C Gain (Saturation): 0% to 200% in 0.1% steps
 Color Phase: -360° to +360° in 0.1 degree steps

YCbCr Clipper

Y Black hard clip (values limited at or above): -6.8% to 50% in 0.1% steps
 Y White hard clip (values limited at or below): 50% to 109.1% in 0.1% steps
 Y White soft clip (values rolled off at): 50% to 109.1% in 0.1% steps
 CbCr Saturation clip (values limited at or below): 50% to 160% in 0.1% steps

Note: This card uses a daughtercard mounted on the card right-side (viewed from front). As such, this card cannot be installed in Slot 20 of a 20-slot frame (the card must be installed in even-numbered slots 2 through 18). Please note this when fitting out a frame using this card.

9066 » UPCONVERTER

with Analog/SDI Input, Audio Embed/De-Embed, Frame Sync, Timecode and Closed Caption Support

OPTIONS

Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC)

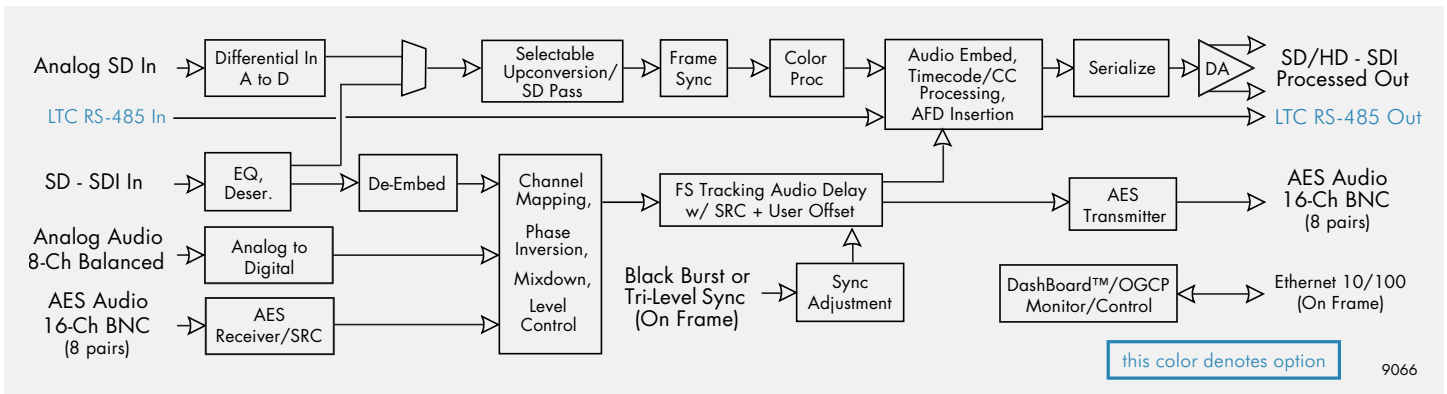


The 9066 offers upconversion (including analog-to-digital conversions using 12-bit conversion depth), SD-SDI and analog video inputs, video processing, full audio embed/de-embed, crosspoint, and level control (with analog and AES discrete audio inputs), and frame sync with video/audio offset. The upconverter allows upconversion to several HD formats, or can pass SD video without conversion.

The 9066 also provides AFD functions that detect the incoming AFD code, allow independent custom ARC to be applied for each incoming AFD code, and set the desired AFD code to be inserted on the output, even if there is no code detected on the input. Closed captions and timecode are preserved through upconversions. CC data is decoded from line 21 and inserted into the SDI stream on a user-selectable line. The 9066 provides full user remote and card-edge processing control (with user memory) that allows adjustment of gain, offset, saturation/hue, audio levels, audio routing, frame sync, and many other controls. Factory presets enable a return to factory settings.

» FEATURES

SD analog and digital inputs	24-bit analog audio conversion	Audio channel mapping, downmixing, and level control	16 user presets
Differential analog video inputs for power hum rejection	Timecode insertion/conversion from SDI input and analog video input sources. +LTC option allows LTC input/output on shared port, with bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.	Audio offset adjustment for lip-sync alignment	Remote control/monitoring via Dashboard™ software or OGCP-9000 control panel
5-line adaptive comb filter for SD-Composite mode	Analog and AES audio inputs and AES output	Frame sync with up to 13 frames of user adjustable delay	Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding
Upconversion and aspect ratio conversion	24-bit audio embedding and de-embedding	Closed captioning support and flexible timecode processing	Five-year warranty
Detail enhancement and noise reduction Selectable safe action, safe title, and center cross overlays		AFD code insertion and AFD ARC control	



» ORDERING INFORMATION

9066 Upconverter with Analog/SDI Input, Audio Embed/De-Embed, Frame Sync, Timecode and Closed Caption Support

RM20-9066-A 20-Slot Frame Rear I/O Module (Standard Width) Analog and Digital Video Input, 4 AES In/Out BNCs, and 2 SDI Output BNCs

RM20-9066-B 20-Slot Frame Rear I/O Module (Standard Width) Analog and Digital Video Input, 4 Analog Audio Inputs, and 2 SDI Output BNCs

RM20-9066-C 20-Slot Frame Rear I/O Module (Double Width) Analog and Digital Video Input, 2 AES In BNCs, 4 AES In/Out BNCs, 8 Analog Audio Inputs, and 2 SDI Output BNCs

RM20-9066-D 20-Slot Frame Rear I/O Module (Double Width) Digital Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 8 AES Out BNCs, and 2 SDI Output BNCs

RM20-9066-E 20-Slot Frame Rear I/O Module (Double Width) Analog and Digital Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 6 AES Out BNCs, and 2 SDI Output BNCs

RM20-9066-F 20-Slot Frame Rear I/O Module (Double Width) Analog and Digital Video In, 4 AES In/Out BNCs, 8 Analog Audio In, RS-485 LTC / Metadata I/O Port, and 2 SDI Output BNCs

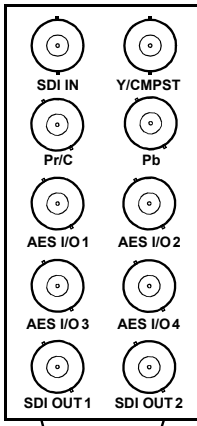
RM20-9066-G 20-Slot Frame Rear I/O Module (Triple Width) Analog and Digital Video In, 8 AES In BNCs, 8 AES Out BNCs, 8 Analog Audio In, and 2 SDI Output BNCs

RM20-9066-E-DIN 20-Slot Frame Rear I/O Module (Standard Width, High-Density) Analog and Digital Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors DIN1.0/2.3)

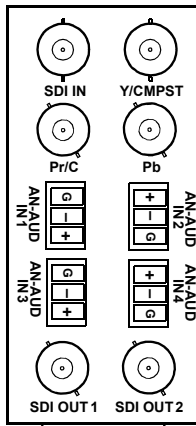
RM20-9066-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, High-Density) Analog and Digital Video Input, 4 AES In, 4 AES In/Out, 6 AES Out, and 2 SDI Output (all connectors HDBNC)



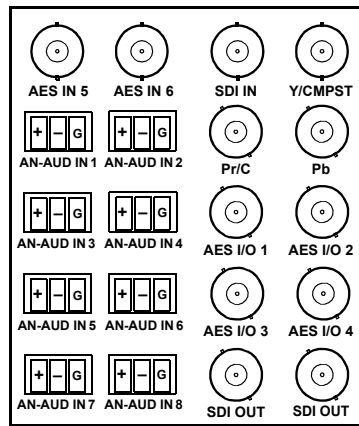
9066



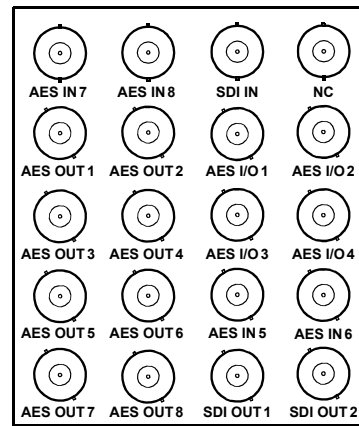
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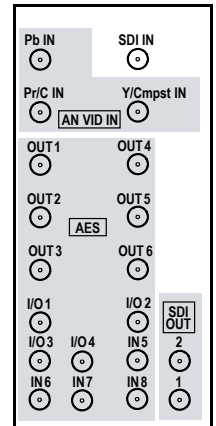
RM20-9066-B



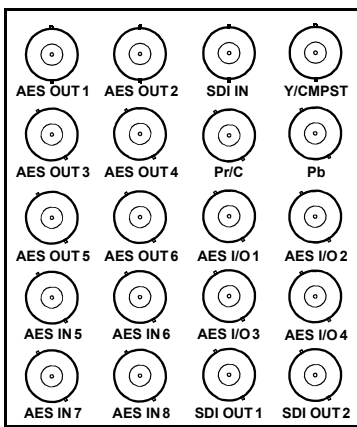
RM20-9066-C



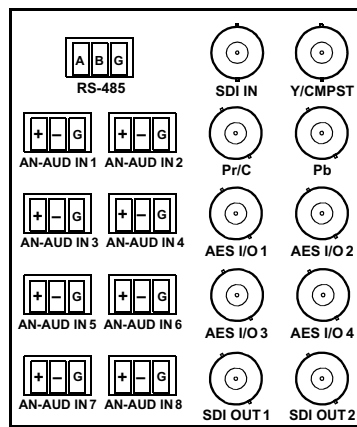
RM20-9066-D



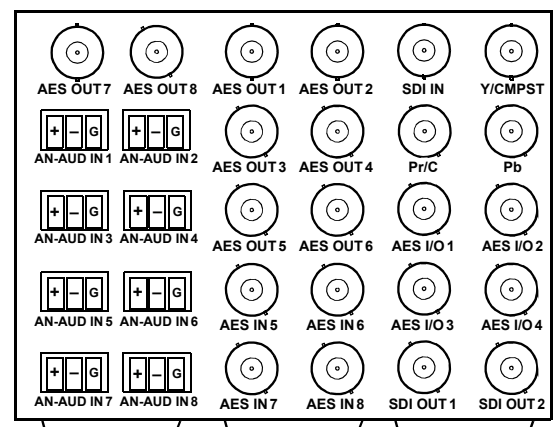
RM20-9066-E
DIN-HDBNC



RM20-9066-E



RM20-9066-F



RM20-9066-G

SPECIFICATIONS

Electrical

Power: 23 watts

HD/SD-SDI Input

Number of Inputs: 1
Standard: SMPTE 292 and 259M
Return Loss: >15 dB at 5 MHz - 1.485 GHz

Analog Video Input

HD Standard: YPbPr or RGB SMPTE
SD Standard: Composite, Y/C or Component (YPbPr BetaCam™, MII™ or SMPTE/N10)

Impedance: 75 Ω

AES Input

Number of Inputs: 16-Ch unbalanced BNC (nominal 48 kHz only)
Impedance: 75 Ω
Input Level: 0.1 V to 2.5 V p-p (5 V p-p tolerant)
Resolution: 24-bit

Analog Audio Input

Number of Inputs: 8-Ch balanced
Signal Level: up to +24 dBu
Sample Rate: 48 kHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Processing

A/D Conversion: HD: 4:4:4 SD: 8:8:8
Quantization: 12-bit A to D and 10-bit video data path
SD Comb Filter: 5-line adaptive
Freq. Response: HD: Y - 0-25 MHz +/- 0.3 dB
HD: Pb, Pr 0-13.5 MHz +/- 0.3 dB
SD: 5.2 MHz +/- 0.25 dB

AES Output

Number of Outputs: 16-Ch unbalanced BNC
Impedance: 75 Ω
Sample Rate: 48 kHz
Resolution: 24-bit

HD/SD-SDI Output

Number of outputs: 2
Standard: SMPTE 292 and 259M
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 270 MHz
>12 dB at 270 MHz - 1.485 GHz
Jitter: HD: < 0.15 UI
SD: < 0.10 UI
Embedded Audio: 16-Ch SD/HD

Note: This card uses a daughtercard mounted on the card right-side (viewed from front). As such, this card cannot be installed in Slot 20 of a 20-slot frame (the card must be installed in even-numbered slots 2 through 18). Please note this when fitting out a frame using this card.

9067 » UPCONVERTER

with SD-SDI Input, Embedded Audio, Frame Sync, Timecode and Closed Caption Support

OPTIONS

Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC)



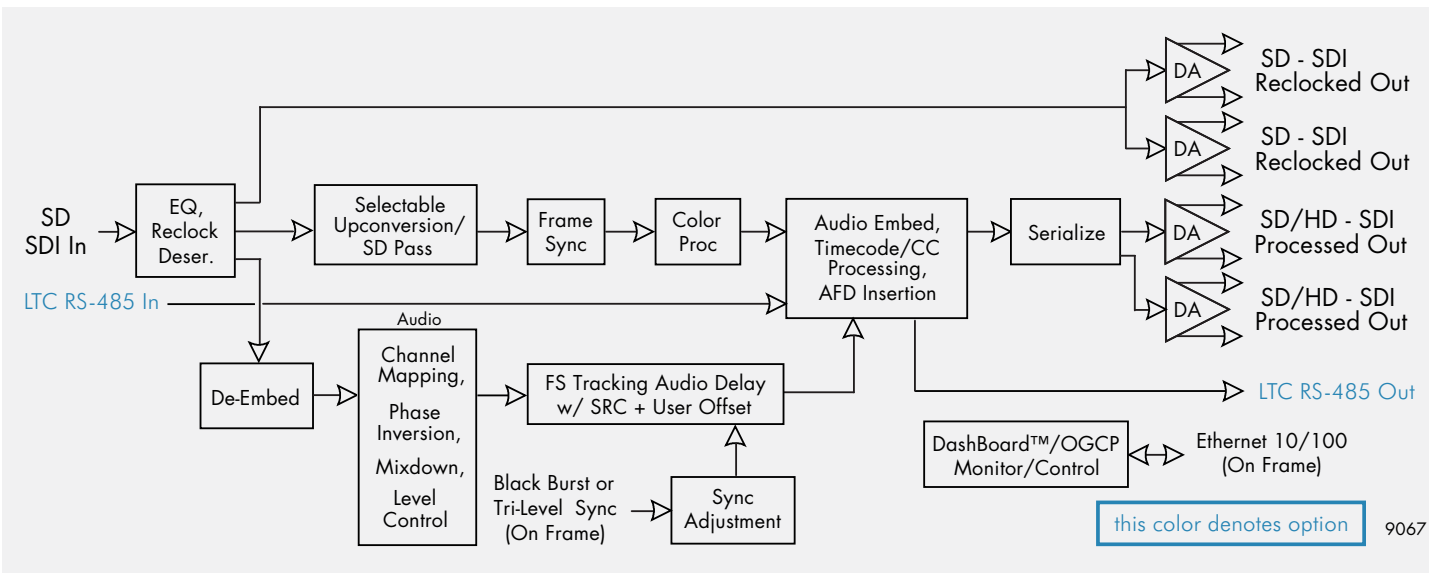
The 9067 is a format converter specifically designed for SD-SDI to HD-SDI conversions. The card features an SD-SDI input, video processing, embedded audio crosspoint and level controls, and frame sync with video/audio offset. The upconverter allows upconversion to several HD formats, or can pass SD video without conversion.

The 9067 also provides AFD functions that detect the incoming AFD code, allow independent custom ARC to be applied for each incoming AFD code, and set the desired AFD code to be inserted on the output, even if there is no code detected on the input. Closed captions and timecode are preserved through upconversions.

Full user remote and card-edge processing control with user memory allow adjustment of gain, offset, saturation, hue, audio levels, audio routing, frame sync, and many other controls. Factory presets enable a return to factory settings.

» FEATURES

SD digital inputs	User-defined audio offset can be applied in frame sync to align Dolby® delay	Frame sync with up to 13 frames of user adjustable delay	16 user presets
SD closed captioning support and flexible timecode processing	Selectable safe action, safe title, and center cross overlays	Embedded audio offset adjustment for lip-sync alignment	Remote control/monitoring via Dashboard™ software or OGCP-9000 control panel
Upconversion and aspect ratio conversion	Timecode insertion/conversion. +LTC option allows LTC input/output on shared port, with bi-directional conversion between VBI and LTC on RS-485 or embedded audio I/O.	Audio channel mapping, downmixing, and level control	Detail enhancement and noise reduction
AFD code insertion and AFD ARC control			Five-year warranty

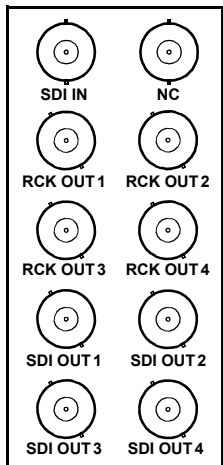


» ORDERING INFORMATION

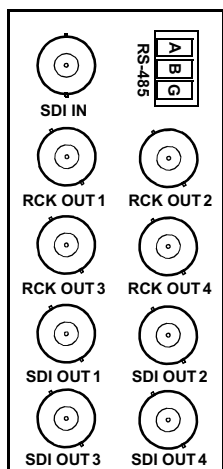
9067 Upconverter with SD-SDI Input, Embedded Audio, Frame Sync, Timecode and Closed Caption Support	RM20-9067-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 SDI Reclocked Outputs, 4 SDI Processed Outputs	RM20-9067-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs, RS-485 LTC / Metadata I/O Port
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9067



RM20-9067-A



RM20-9067-B

» FORMAT CONVERTERS	9061	9062	9064	9066	9067	9068	9821	9822
SDI Inputs	1	1	1	1	1	1	1	1
SDI Processed Outputs	2	4	4	2	4	4	4	4
SDI Input Copies	0	4	4	0	4	4	4	4
Analog Video Input	.			.				
Analog Video Output							.	
Analog Audio Input	.			.				
Analog Audio Output							.	
Remote Control & Monitoring	.	.	.	.	.	.	.	.
SNMP	.	.	.	.	.	.	.	.
AES Embedding	.			.				
AES De-Embedding	.			.				
Frame Sync	.	.	.	.	.			.
Upconversion	.	.	.	.	.	.
Downconversion	.	.	.				.	.
Cross Conversion	.	.	.					
HD <-> SD Closed Captioning	.	.	.	.	.	.	.	.
HD <-> SD Timecode Conversion	.	.	.	.	.	.	.	.
HD <-> SD Emb Audio Conversion	.	.	.	.	.	.	.	.
Embedded Audio Delay	.	.		.	.			.
Adjustable Video Delay	.	.		.	.			.
AFD ARC Control	.	.	.	.	.	.		.
AFD Code Insertion	.	.	.	.	.	.		.
Audio Downmixing	.	.		.	.			.
Color Correction			.					

» SPECIFICATIONS

Electrical

Power: 18 watts

HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 292 and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
 Standard: Tri-level sync (SMPTE 274) and Black Burst (NTSC and PAL)

HD/SD-SDI Output

Number of Outputs: 4 relocked
 4 processed
 Standard: SMPTE 292 and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz
 Jitter: HD: < 0.15 UI
 SD: < 0.10 UI
 Embedded Audio: 16-Ch SD/HD

Note: This card uses a daughtercard mounted on the card right-side (viewed from front). As such, this card cannot be installed in Slot 20 of a 20-slot frame (the card must be installed in even-numbered slots 2 through 18). Please note this when fitting out a frame using this card.

9068 » UPCONVERTER

with SD-SDI Input, Timecode and Closed Caption Support



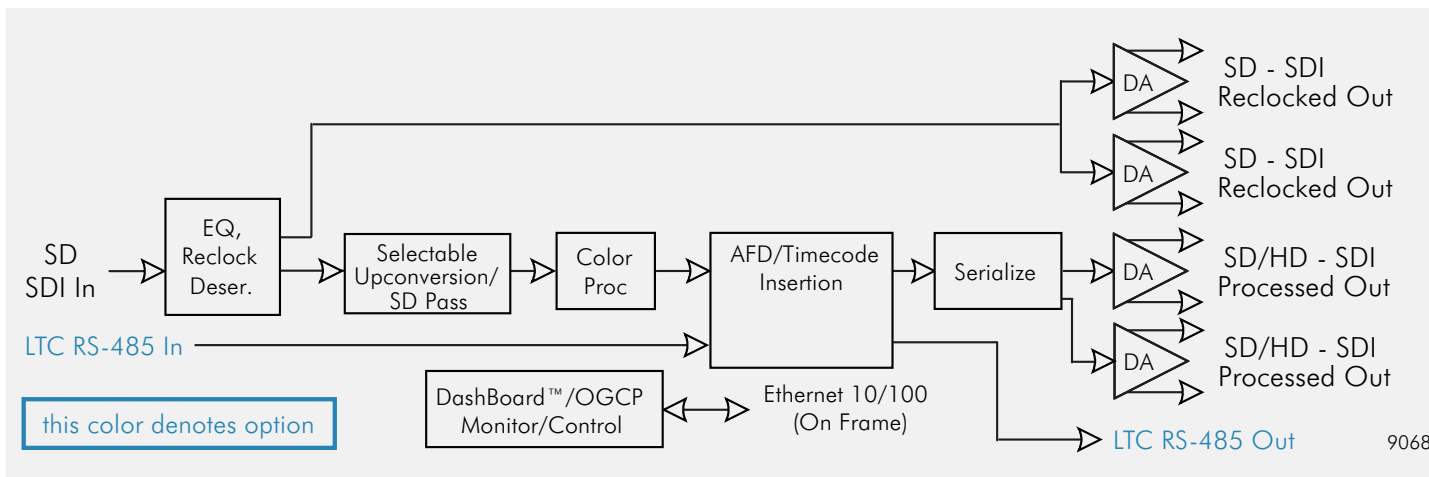
The 9068 is a format converter specifically designed for video-only SD-to-HD conversions. The card features an SD-SDI input, video processing, and frame sync. The upconverter allows upconversion to several HD formats, or can pass SD video without conversion.

The 9068 also provides AFD functions that detect the incoming AFD code, allow independent custom ARC to be applied for each incoming AFD code, and set the desired AFD code to be inserted on the output, even if there is no code detected on the input. Closed captions and timecode are preserved through upconversions.

The 9068 provides full user remote and card-edge processing control (with user memory) that allows adjustment of gain, offset, saturation, hue, and many other controls. Factory presets enable a return to factory settings.

» FEATURES

SD digital inputs	HD/SD closed captioning support and flexible timecode processing	Selectable safe action, safe title, and center cross overlays	Detail enhancement and noise reduction
Upconversion and aspect ratio conversion	Timecode insertion/conversion.	16 user presets	Five-year warranty
AFD code insertion and AFD ARC control		Remote control/monitoring via DashBoard™ software or OGCP-9000 control panel	



» ORDERING INFORMATION

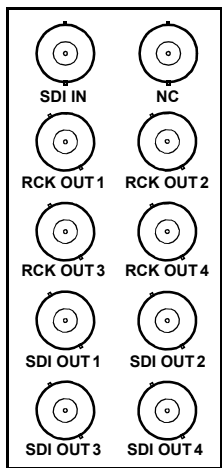
9068 Upconverter with SD-SDI Input, Timecode and Closed Caption Support

RM20-9068-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 SDI Reclocked Outputs, 4 SDI Processed Outputs

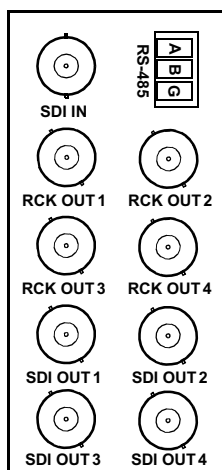
RM20-9068-B 20-Slot Frame Rear I/O Module (Standard Width) SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs, RS-485 LTC I/O Port



9068



RM20-9068-A



RM20-9068-B

» FORMAT CONVERTERS	9061	9062	9064	9066	9067	9068	9821	9822
SDI Inputs	1	1	1	1	1	1	1	1
SDI Processed Outputs	2	4	4	2	4	4	4	4
SDI Input Copies	0	4	4	0	4	4	4	4
Analog Video Input	.			.				
Analog Video Output							.	
Analog Audio Input	.			.				
Analog Audio Output							.	
Remote Control & Monitoring	.	.	.	.	.	.	.	.
SNMP	.	.	.	.	.	.	.	.
AES Embedding	.			.				
AES De-Embedding	.			.				
Frame Sync	.	.	.	.	.			.
Upconversion	.	.	.	.	.	.
Downconversion	.	.	.				.	.
Cross Conversion	.	.	.					
HD <-> SD Closed Captioning	.	.	.	.	.	.	.	.
HD <-> SD Timecode Conversion	.	.	.	.	.	.	.	.
HD <-> SD Emb Audio Conversion	.	.		.	.	.	.	.
Embedded Audio Delay	.	.		.	.			.
Adjustable Video Delay	.	.		.	.			.
AFD ARC Control	.	.	.	.	.	.		.
AFD Code Insertion	.	.	.	.	.	.		.
Audio Downmixing	.	.		.	.			.
Color Correction			.					

» SPECIFICATIONS

Electrical

Power: 18 watts

SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
 Standard: Tri-level sync (SMPTE 274) and Black Burst (NTSC and PAL)

HD-SDI Output

Number of Outputs: 4 reclocked
 4 processed
 Standard: SMPTE 292
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz
 Jitter: HD: < 0.15 UI

Note: This card uses a daughtercard mounted on the card right-side (viewed from front). As such, this card cannot be installed in Slot 20 of a 20-slot frame (the card must be installed in even-numbered slots 2 through 18). Please note this when fitting out a frame using this card.



9901-UDX » 3G/HD/SD UP/DOWN/CROSS CONVERTER WITH FRAME SYNC

All base models are also available as HD/SD only (for example, 9901-UDX-HD). All other features and specifications remain the same.



The award-winning 3G/HD/SD-SDI Fusion3G® 9901-UDX card offers up/down/cross format conversion, frame sync, and advanced audio and ancillary data support, plus many other powerful features. Full audio support includes per-channel audio delay. Remote control is quick and easy with the free DashBoard™ remote control software or the Cobalt OGCP-9000 remote control panels.

Alternate Base Models:

9901-UC

SD to 3G/HD Upconverter with 3G/HD/SD Passthrough

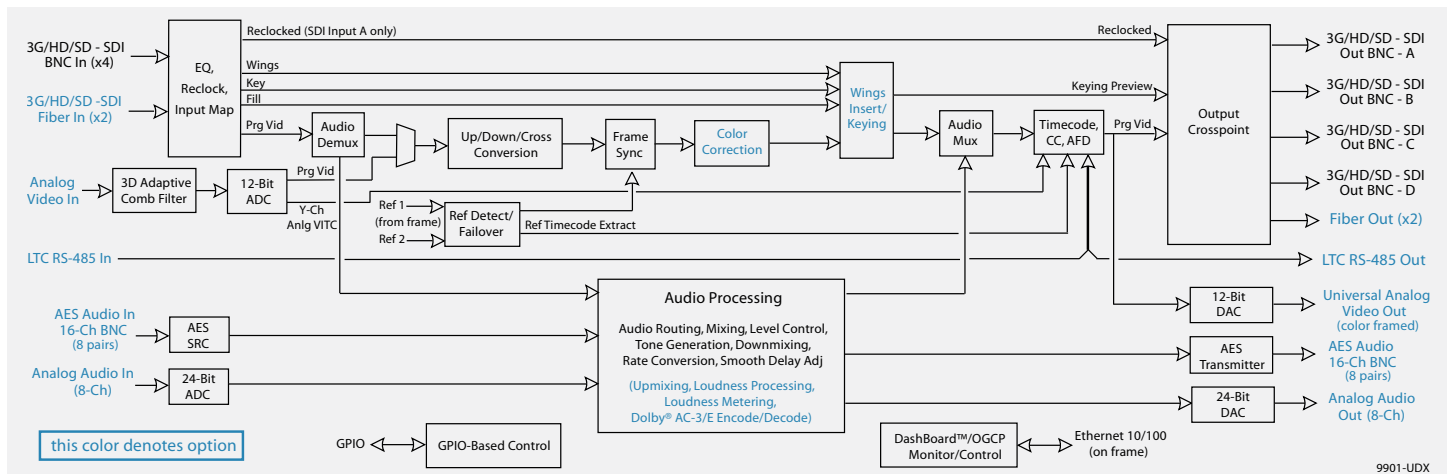
9901-DC

3G/HD to SD Downconverter with 3G/HD/SD Passthrough

9901-XC

3G/HD to 3G/HD Cross Converter with 3G/HD/SD Passthrough

You can select from options to add (as inputs and/or outputs) fiber, analog video, AES, and analog audio. This level of integration reduces module count and simplifies the signal chain, as well as providing flexibility for ever-changing requirements, including 3-D TV compliant 1080p. Options also include wings insertion, general purpose keying, color correction, Dolby® E/AC-3 encoding and decoding (with both decode and re-encode on the same card), ITU/ATSC/EBU compliant loudness metering, and Linear Acoustic® upmixing and loudness processing. Where the full conversion capability is not required, the 9901 series is available as the following base model versions (if desired later, any of these versions can be field upgraded to base 9901-UDX functionality using a firmware upgrade without removing the card from its frame).



9901-UDX

STANDARD FEATURES

Full 3G/HD/SD-SDI support on BNC coax

Advanced up/down/cross format conversions utilizing high-quality, motion-adaptive de-interlacing and video scaling techniques

Preset standard and user-definable ARC w/configurable pan, tilt, & crop controls

HD/SD captioning format translation

Per-channel audio delay with glitchless delay adjustment

Frame sync with reference failover using dual reference inputs on frame

Full SMPTE timecode support with translation between formats. Timecode sources selectable from SDI and analog video inputs, reference, and internally generated.

Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features

GPIO ports with user-definable functions for system automation and monitoring

Centralized GUI remote control using DashBoard™ software and Cobalt OGCP-9000 remote control panels – custom settings saved as presets can be recalled manually, or with GPI or events-based triggering

Five-year warranty

OPTIONAL FEATURES

Fiber 3G/HD/SD inputs/outputs. Fiber ports use blind mating interface, allowing card swapping (including optical transceivers) with no cable disconnection.

Analog audio I/O

Wings insertion and general purpose keying feature

LTC input/out and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O

Relay bypass available from SDI input to SDI output

Universal HD/SD analog I/O. Composite video input sources converted with 3D comb decoder, mitigating common decoding artifacts. Composite video output is color-framed to match reference burst, plus user offset.

AES embedding/de-embedding. AES ports are GUI selectable as input or output. Each input has independent sample rate converter.

Linear Acoustic® loudness processing and automatic upmixer technology

Full Dolby® E / AC-3 encoding and decoding options. Decode + re-encode and multiple AC-3 streaming available on the same card.





9901-UDX)) OPTIONS

)) I/O OPTIONS

16 CHANNEL AUDIO EMBEDDING/DE-EMBEDDING (+AES)

Provides eight (total) AES pair BNC connections that can be GUI-configured as inputs or outputs. Independent SRC for all AES inputs, with auto and manual bypass for non-PCM data.

8-PORT AES OUTPUT EXPANSION (+AES16)

Provides the 16-channel embed/de-embed of option +AES (see above) as well as eight added AES output ports to provide a total complement of AES I/O 1 thru AES I/O 8 and added ports AES OUT 1 thru AES OUT 8. Allows 16 channels of AES embedding and 16 channels of AES de-embedding simultaneously. (Option is not available as a field upgrade and also requires Rear I/O Module RM20-9901-G.)

LTC RS-485/AUDIO INPUT/OUTPUT (+LTC)

Provides LTC input/output and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.

)) VIDEO OPTIONS

WINGS INSERTION (+WINGS)

Provides wings insertion using an independent SDI input provided for wings signal. Provides programmable insertion width.

KEYING (+KEYER)

Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output.

Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

)) AUDIO OPTIONS

LINEAR ACOUSTIC® LOUDNESS PROCESSING (+LP51/+LP20)*

Featuring Linear Acoustic® AEROMAX® technology and available in 5.1-channel (LP51) and stereo (LP20) configurations. These loudness processors use inputs from any source received by the card, or any mixing setting produced by the card. AEROMAX® algorithms use a sophisticated multi-band approach to loudness processing, and can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible.

Up to two 5.1 loudness processors can be ordered per card, order as +LP51A and +LP51B. Up to four stereo loudness processors can be ordered per card, order as +LP20A, +LP20B, +LP20C and +LP20D.

LINEAR ACOUSTIC® AUTOMATIC UPMIXER (+UM)*

Featuring Linear Acoustic® UPMAX™ technology, upmixing allows legacy stereo program content to be converted to full 5.1-channel audio. UPMAX™ mode detects 2.0 content and automatically applies upmix mode (with configurable switchover fade-in/fade-out) depending on absence or presence of 5.1 source audio.

Up to two upmixers may be configured on the card, order as +UMA and +UMB.

SOFTWARE LOUDNESS METER (+LM-C)

Cobalt's +LM audio loudness metering option (in conjunction with a Cobalt OGCP-9000 Remote Control Panel with +LM-P option) provides a flexible solution for ingest or on-air loudness metering and assessment in compliance with ITU/ATSC/EBU standards. Easy to use, the +LM offers "true peak" level detection, error tracking and logging, and intuitive interface with touch screen control.

FIBER INPUTS/OUTPUTS (+FRX / +FTX / +FRXTX / +FRXRX / +FTXTX)*

Provides one or two fiber connections per card. Inputs can serve any function in the product, outputs can be assigned from any function in the card. Connector type is dual LC with blind-mate connectors. Cards are fully swappable.

UNIVERSAL ANALOG VIDEO INPUTS/OUTPUTS (+ANV)*

Provides an analog video input and output (CVBS, component, RGB (sync on green))

ANALOG AUDIO INPUTS/OUTPUTS (+ANA)*

Provides up to eight channels (total) of balanced analog audio inputs and outputs

*Requires expansion Rear Module (for example, 9901-UDX+ANV requires RM20-9901-XB expansion Rear Module)

COLOR CORRECTION (+COLOR)

Provides independent RGB channel controls for luma, black, and gamma. Ultra-fast response time. The color correction feature is perfectly suited for use with Cobalt OGCP-9000/CC Remote Control Panel.

UPGRADE TO 3G (+3G)

Upgrades a 9901 HD/SD alternate base model to 3G/HD/SD.

FRAME BUFFER EXPANSION (+MEM)

Increases the independently adjustable audio and video delay buffer capacity to 47 seconds for SD video, 8 seconds for HD video, or 4 seconds for 3G video. (+MEM is a hardware-based option and is not available as a field upgrade. This option is displayed as "+2GB" on the DashBoard card info pane.)

AUDIO FAILOVER (+AFO)

Provides automatic failover to alternate ("secondary") channels to substitute for the primary channels in the event of audio signal loss.

AUTO DOWNMIX (+ADM)

Provides automatic Stereo downmix from selected alternate multi-channel sources if primary Stereo channels lose signal.

DOLBY® DIGITAL/DIGITAL PLUS™ ENCODING (+ENCD)

Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card. Up to four independent encoders - all on the same card - can be included (+ENCD through +ENCD4). This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

DOLBY® E/DIGITAL/DIGITAL PLUS™ DECODING (+DEC)

Decodes Dolby® E, Digital, and Digital Plus™ signals from AES or embedded sources. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

DOLBY® E ENCODING (+ENCE)

Provides Dolby® E encoding from any combination of audio sources supported by the card. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

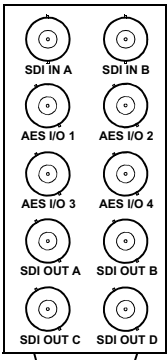
DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENCDS)

Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus(TM) encoding. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

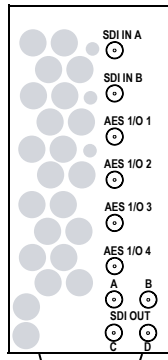
*The following Processing/Upmixing combinations, and their subsets, are available. Contact sales for more information.

- Upmixer, 5.1 Processor, Aux Stereo Processor (+UMA, +LP51A, +LP20A)
- Two stereo processors, Two upmixers (+LP20A, +LP20B, +UMA, +UMB)
- Two 5.1 loudness processors (+LP51A, +LP51B)
- Four stereo loudness processors (+LP20A, +LP20B, +LP20C, +LP20D)

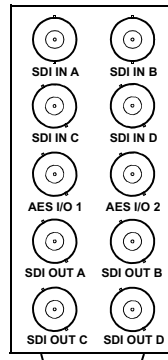
9901-UDX



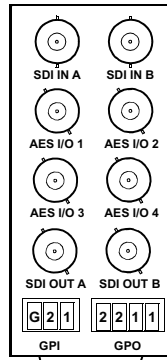
RM20-9901-B



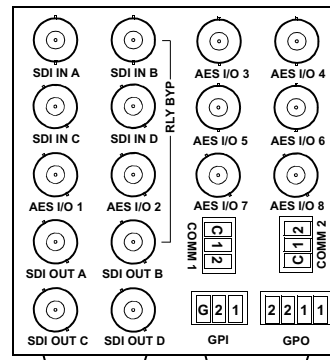
RM20-9901-B-HV



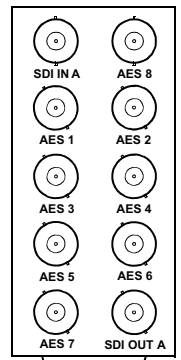
RM20-9901-C



RM20-9901-D

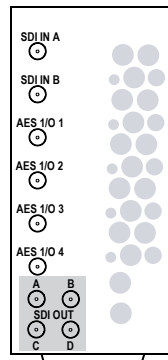


RM20-9901-E

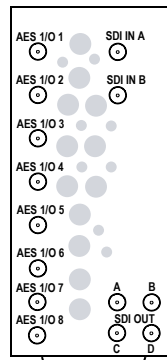


RM20-9901-F

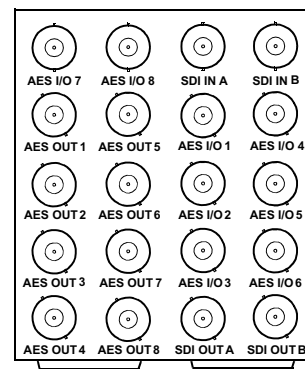
EXPANSION REAR I/O MODULES



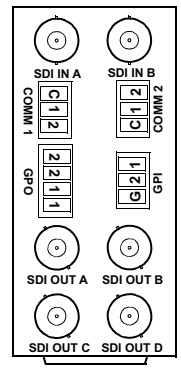
RM20-9901-F-HV2



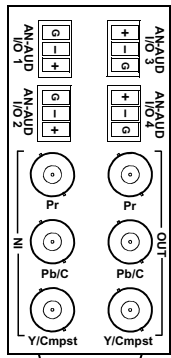
RM20-9901-F-HV



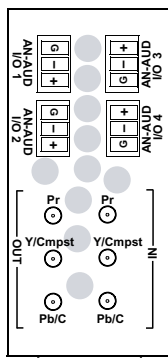
RM20-9901-G



RM20-9901-H

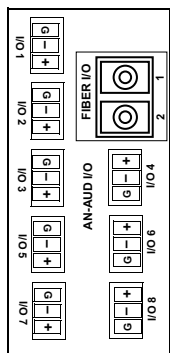


RM20-9901-XB

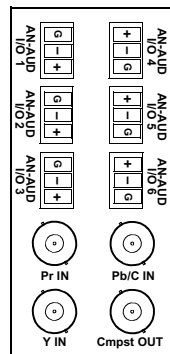


RM20-9901-XB-HV

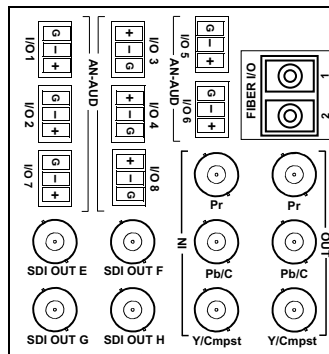
Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "X" in the part number and must be used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 3)



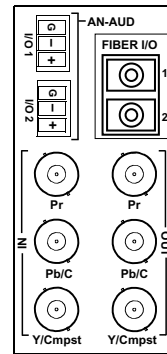
RM20-9901-XC



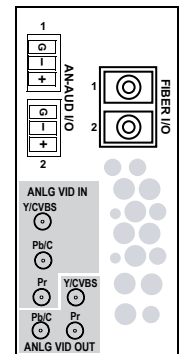
RM20-9901-XD



RM20-9901-XE



RM20-9901-XF



RM20-9901-XF-HV

9901-UDX

ORDERING INFORMATION

9901-UDX 3G/HD/SD Up/Down/Cross Converter with Frame Sync

9901-UC SD to 3G/HD Upconverter with 3G/HD/SD Passthrough

9901-DC 3G/HD to SD Downconverter with 3G/HD/SD Passthrough

9901-XC 3G/HD to 3G/HD Cross Converter with 3G/HD/SD Passthrough

BASE REAR I/O MODULES

Base Rear I/O Modules provide connections for standard card BNC video and audio connections, as well as other connections depending on rear module part number. These modules mate directly with the Fusion3G® card.

RM20-9901-B 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Inputs, 4 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9901-B-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9901-B-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9901-C 20-Slot Frame Rear I/O Module (Standard Width) 4 3G/HD/SD-SDI Inputs, 2 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9901-D 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Inputs, 4 AES I/O BNCs, 2 GPIO, 2 3G/HD/SD-SDI Outputs

RM20-9901-E 20-Slot Frame Rear I/O Module (Double Width) 4 3G/HD/SD-SDI Inputs (1 with Relay Bypass), 8 AES I/O BNCs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI Outputs

RM20-9901-F 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 1 3G/HD/SD-SDI Output

RM20-9901-F-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9901-F-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9901-F-HV2-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) (2) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors DIN 1.0.2.3)

RM20-9901-F-HV2-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) (2) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors HD-BNC)

RM20-9901-G 20-Slot Frame Rear I/O Module (Double Width) 2 3G/HD/SD-SDI Inputs, 8 AES I/O BNCs, 8 additional AES Outputs, 2 3G/HD/SD-SDI Outputs (Available only in conjunction with card option +AES16)

RM20-9901-H 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI BNC Inputs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI BNC Outputs

-HD HD/SD Only Option for any card model listed above (e.g., 9901-UDX-HD)

+UDX Field-upgrade to +UDX option for 9901-UC/9901-DC/9901-XC models
+3G Upgrade of **-HD** alternate model to 3G/HD/SD

EXPANSION REAR I/O MODULES

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "-X" in the part number and must be used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 3)

RM20-9901-XB 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9901-XB-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9901-XB-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9901-XC 20-Slot Frame Rear I/O Module (Standard Width) 2 Fiber I/O, 8 Analog Audio I/O

RM20-9901-XD 20-Slot Frame Rear I/O Module (Standard Width) Component In, 6 Analog Audio I/O, Composite Out

RM20-9901-XE 20-Slot Frame Rear I/O Module (Double Width) Component In, 2 Fiber I/O, 8 Analog Audio I/O, Component Out, 4 3G/HD/SD-SDI Outputs

RM20-9901-XF 20-Slot Frame Rear I/O Module (Standard Width) Component In, 2 Fiber I/O, 2 Analog Audio I/O, Component Out

RM20-9901-XF-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are DIN1.0/2.3) This Rear I/O Module must be used with an HV Base Rear I/O Module.

RM20-9901-XF-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are HD-BNC) This Rear I/O Module must be used with an HV Base Rear I/O Module.

9902-UDX » 3G/HD/SD-SDI UP-DOWN-CROSS CONVERTER/FRAMESYNC/AUDIO EMBED/DE-EMBED with Auto-Changeover and Character Burn



The all-new Cobalt® 9902-UDX 3G/HD/SD Up-Down-Cross Converter/Framesync/Audio Embed-De-Embed with Multi-Input Auto-Changeover provides a high-density card-based solution that offers unprecedented multi-input support, flexibility, and ease of use and integration.

With option +ANC, the 9902-UDX offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams. The easy to use interface allows direct access to DID and SDID locations to extract or insert user data such as camera PTZ, SCTE 104, closed-captioning read/insert, GPI/GPO via ANC, or other specialized user payloads. Data can be extracted and inserted within the card, bypassing the scaler (Bridge mode), or inserted and/or extracted to and from external interface via serial or IP interfaces.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. Quality Check option +QC allows failover to alternate inputs based on user-configurable criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Import of user trouble slate graphics is also

supported in addition to standard test pattern insert as an input LOS marker. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected, with event actions consisting of GPO, automated alert email actions, or go-to card user presets or other actions.

The up/down/cross convert scaler is specifically designed for broadcast video progressive and interlaced formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. 3:2 pulldown optimization allows A-frame to use alignment correlated to received timecode or 6 Hz external input over GPI.

Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video. The 9902-UDX also provides analog CVBS video inputs and outputs, and AES/analog audio embedding and de-embedding.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. Full user Dashboard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Multi-input, with manual selection or intelligent Auto-Changeover failover

Closed-captioning absence detection and flagging, with GPO, automated alert email, go-to user preset, or other actions

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides failover on criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static

Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Framesync with full H/V offset and manual/LOS video pattern generator

3:2 pulldown optimization allows A-frame alignment correlated to received timecode or 6 Hz external input over GPI

Up/Down/Cross Conversion and ARC specifically tailored for broadcast video

Supports import of user trouble slate graphic file for LOS failover insertion

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

CVBS analog video I/O and analog/AES embed / de-embed available

Audio options include loudness processing, upmixing, and Dolby decode/encode

Video options include CGMS support, color correction, and keying

Option +ANC adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads. Multi-mode setup includes Bridge mode (card internal path with scaler bypass bridging) or Insert/Extract modes for insert/extract to or from IP/serial external interfaces.

Supports import of user trouble slate graphic file for LOS failover insertion

Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty

OPTIONS

Quality Check (+QC). Provides failover on criteria such as black/frozen frame or audio silence.

Key/Fill Keyer (+KEYER). Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

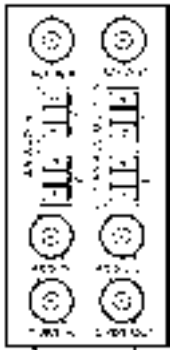
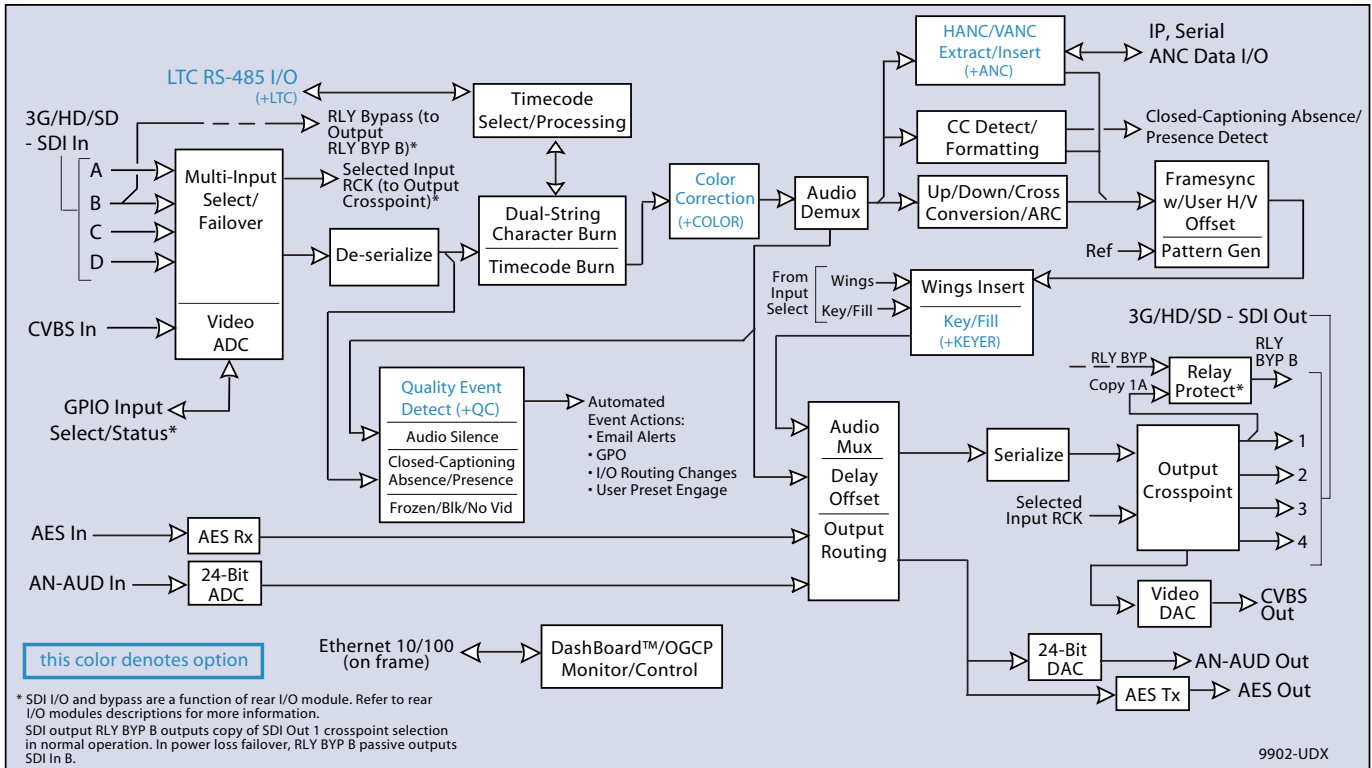
Audio LTC (+LTC)

Color Correction (+COLOR). Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

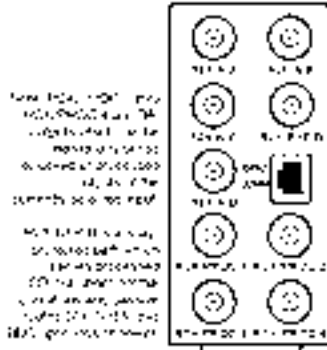
Ancillary Data Processor (+ANC). Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces. Bridge mode can be set to preserve special/custom ANC packages when card scaler is enabled.



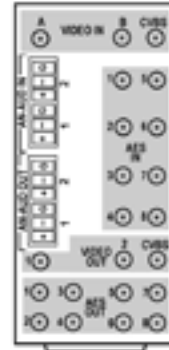
9902-UDX



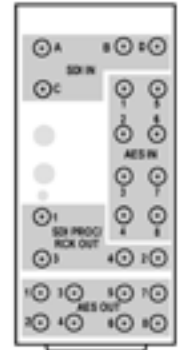
RM20-9902-B



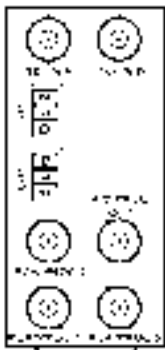
RM20-9902-C



RM20-9902-D-DIN
RM20-9902-D-HDBNC



RM20-9902-E-DIN
RM20-9902-E-HDBNC



RM20-9902-F

9902-UDX

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
 Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
 SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
 SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
 SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
 SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
 Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
 Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input
 (1) 75Ω BNC output (selectable as Path 1 or Path 2 processed output). CVBS output functional only when selected path is carrying SD-SDI.
 ADC resolution: 9-bit
 Sampling frequency: 27 MHz (2x over-sampling)
 Y/C separation: 4 line Adaptive Comb Filter
 Freq. Response: ± 0.25 dB to 5.5 MHz
 SNR: > 50 dB to 5.5 MHz (unweighted)
 Differential Phase: < 1 degree
 Differential Gain: < 1%
 Nonlinearity < 1%

Discrete Audio Input/Outputs

AES-3id 75? inputs (8 pair (16-Ch) max)
 AES-3id 75? outputs (8 pair (16-Ch) max)
 Input AES SRC Range: 32 to 96 kHz
 Balanced analog audio inputs (4-Ch max)
 Balanced analog audio outputs (4-Ch max)
 (I/O conforms to 0 dBFS = +24 dBu)
 Analog Output Impedance: < 50 Ω
 Analog Reference Level: -20 dBFS
 Analog Nominal Level: +4 dBu
 Analog Max Output Level: +24 dBu (0 dBFS)
 Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
 Analog SNR: 115 dB (A weighted)
 Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)
 Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level".

9902-UDX

ORDERING INFORMATION

9902-UDX 3G/HD/SD Up-Down-Cross Converter/Framesync with Multi-Input Auto-Changeover

RM20-9902-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SD-SDI Output BNCs, (1) CVBS Processed Out BNC, (2) Balanced Analog Audio Outputs

RM20-9902-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), (1) GPIO/COMM RJ-45 connector

RM20-9902-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9902-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9902-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9902-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC.)

RM20-9902-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as processed or relocked of selected input, (2) GPI, (2) GPO

+QC Quality Check Option. Provides failover on subjective criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+ANC Ancillary Data Processor

9903-UDX-ADDA » 3G/HD/SD-SDI UNIVERSAL FORMAT CONVERTER

with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Framesync, AES and Analog Audio Embedding/De-Embedding



The all-new Cobalt® 9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Framesync, AES and Analog Audio Embedding / De-Embedding provides a high-density card-based solution that offers unprecedented multi-input support, flexibility, and ease of use and integration for SDI and analog video and discrete audio. Frame sync provides glitch-free audio upon framesync events, with video/audio offsets user configurable. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

With option +ANC, the 9903-UDX-ADDA offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams. The easy to use interface allows direct access to DID and SDID locations to extract or insert user data such as camera PTZ, SCTE 104, closed-captioning read/insert, GPI/GPO via ANC, or other specialized user payloads. Data can be extracted and inserted within the card, bypassing the scaler (Bridge mode), or inserted and/or extracted to and from external interface via serial or IP interfaces.

Multiple SDI input ports allow selection from multiple input sources with clean switching performed on the RP168 switch line. Both CVBS and component analog video is supported both as inputs and outputs.

The up/down/cross convert scaler is specifically designed for broadcast video formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Multi-input, with SDI RP168 switch line clean switching

Universal I/O support – analog CVBS and component inputs and outputs, as well as analog and AES audio embed/de-embed. 10-bit processing with 5-line adaptive comb filtered SD Y/C separation.

Framesync with full H/V offset and manual/LOS video pattern generator

Up/Down/Cross Conversion and ARC specifically tailored for broadcast video

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

Option +ANC adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads. Multi-mode setup includes Bridge mode (card internal path with scaler bypass bridging) or Insert/Extract modes for insert/extract to or from IP/serial external interfaces.

Available color correction option

Low-power/high-density design – less than 13 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty

OPTIONS

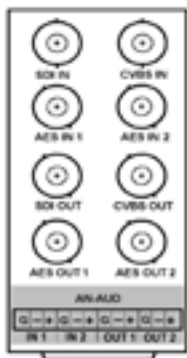
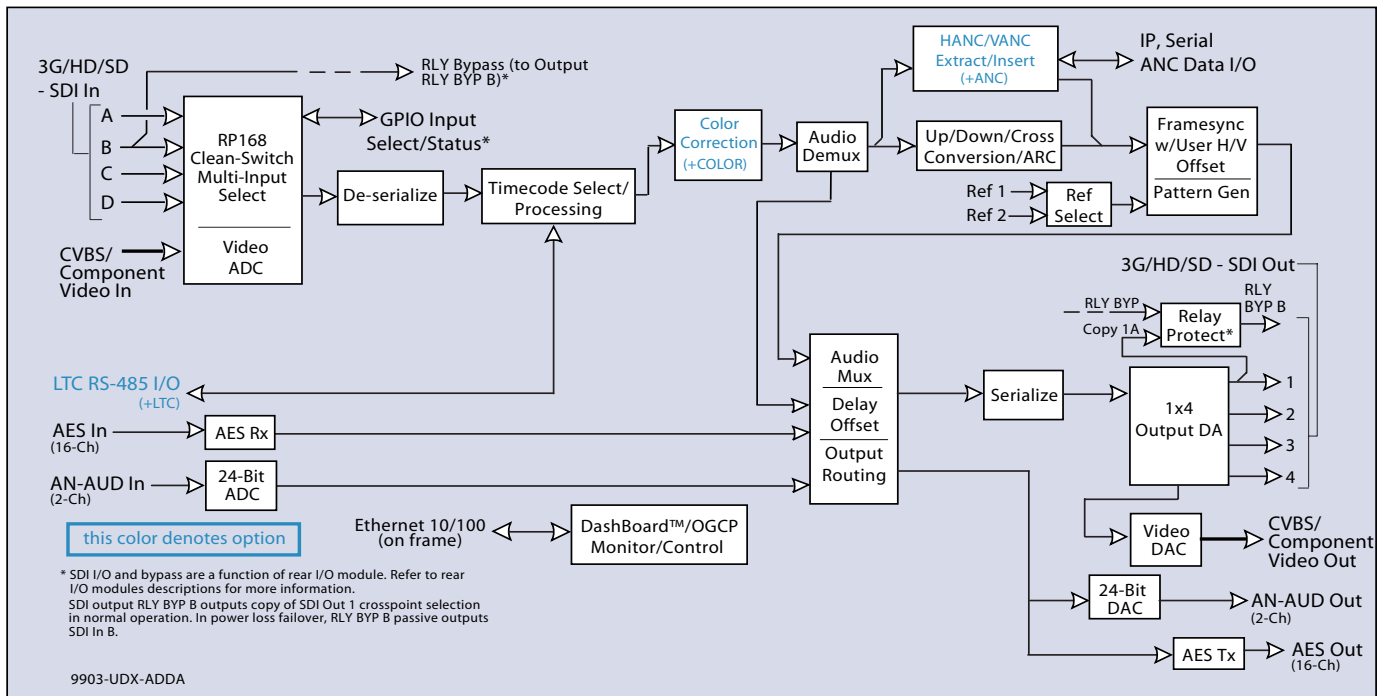
Audio LTC I/O (+LTC)

Ancillary Data Processor (+ANC). Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces. Bridge mode can be set to preserve special/custom ANC packages when card scaler is enabled.

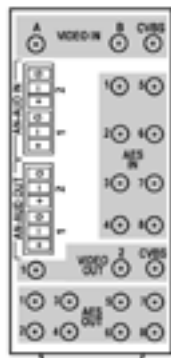
Color Correction (+COLOR)



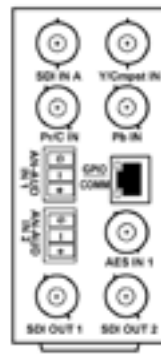
9903-UDX-ADDA



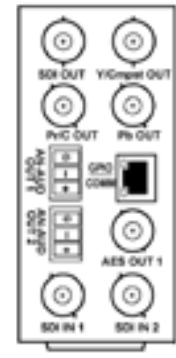
RM20-9903-B



RM20-9903-D-DIN
RM20-9903-D-HDBNC



RM20-9903-E



RM20-9903-F

Rear Module complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new rear module models.

9903-UDX-ADDA

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 13 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Analog Video Input/Outputs

(1) 75Ω BNC CVBS input

(1) 75Ω BNC CVBS output. CVBS can be upsampled to any supported SDI format; all SDI formats can be downconverted to CVBS.

(3) 75Ω BNC Component Video inputs (Y, Cb, Cr)

(3) 75Ω BNC Component Video outputs (Y, Cb, Cr)

ADC resolution: 10-bit

Sampling frequency: 54 MHz (4x over-sampling SD)

SD Y/C separation: 5 line Adaptive Comb Filter

SD Freq. Response: ± 0.25 dB to 5.5 MHz

SD SNR: > 55 dB to 5.5 MHz (unweighted)

Differential Phase: < 1 degree

Differential Gain: < 1%

Nonlinearity < 1%

HD Freq. Response: Y 30 MHz., PbPr 15 MHz

HD SNR: > 55 dB to 30 MHz (unweighted)

Discrete Audio Input/Outputs

(8) AES-3id 75? BNC input

(8) AES-3id 75? BNC output

(2) Balanced analog audio inputs

(2) Balanced analog audio outputs

I/O conforms to 0 dBFS = +24 dBu

Analog Input Impedance: >10 kΩ

Analog Reference Level: -20 dBFS

Analog Nominal Level: +4 dBu

Analog Input Clip Level: +24 dBu (0 dBFS)

Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

Analog SNR: 115 dB (A weighted)

Analog THD+N: -96 dB (20 Hz to 10 kHz)

Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level".

Return Loss: >35 dB up to 5.75 MHz

9903-UDX-ADDA

ORDERING INFORMATION

9903-UDX-ADDA 3G/HD/SD-SDI Universal Format Converter with CVBS/YpPr Video I/O, Up/Down/Cross Conversion, Framesync, AES and Analog Audio Embedding / De-Embedding

RM20-9902-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNCs, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SD-SDI Output BNCs, Component/CVBS Video Out BNC, (2) Balanced Analog Audio Outputs

RM20-9902-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9902-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9902-E 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNCs, Component/CVBS Video In BNCs, (1) AES In BNC, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Output BNCs, (1) GPIO/COMM RJ-45 connector

RM20-9902-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, Component/CVBS Video Out BNCs, (1) AES Out BNC, (2) Balanced Analog Audio Outputs, (1) 3G/HD/SD-SDI Output BNC, (1) GPIO/COMM RJ-45 connector

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+ANC Ancillary Data Processor

9081 » HD/SD FRAME SYNC with Embedded Audio Processing

OPTIONS

Dolby® Digital/E Decoding (+DEC), Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC)



The 9081 is an HD/SD frame sync with tracking embedded audio delay. This allows seamless, glitch-free handling of embedded audio if a frame is dropped or duplicated. The 9081 also includes video processing, audio gain and routing controls, and test tone generators – all with user memory.

» FEATURES

Frame sync with up to 13 frames of user adjustable delay

HD/SD closed captioning support and flexible timecode processing

Audio channel mapping, downmixing, and level control

Video level controls

24-bit embedded audio processing

Dolby® Digital/E decoder option

Timecode insertion/conversion. +LTC option allows LTC input/output on shared port, with bi-directional conversion between VBI and LTC on RS-485 or embedded audio I/O.

User offset to frame sync to align Dolby® delay

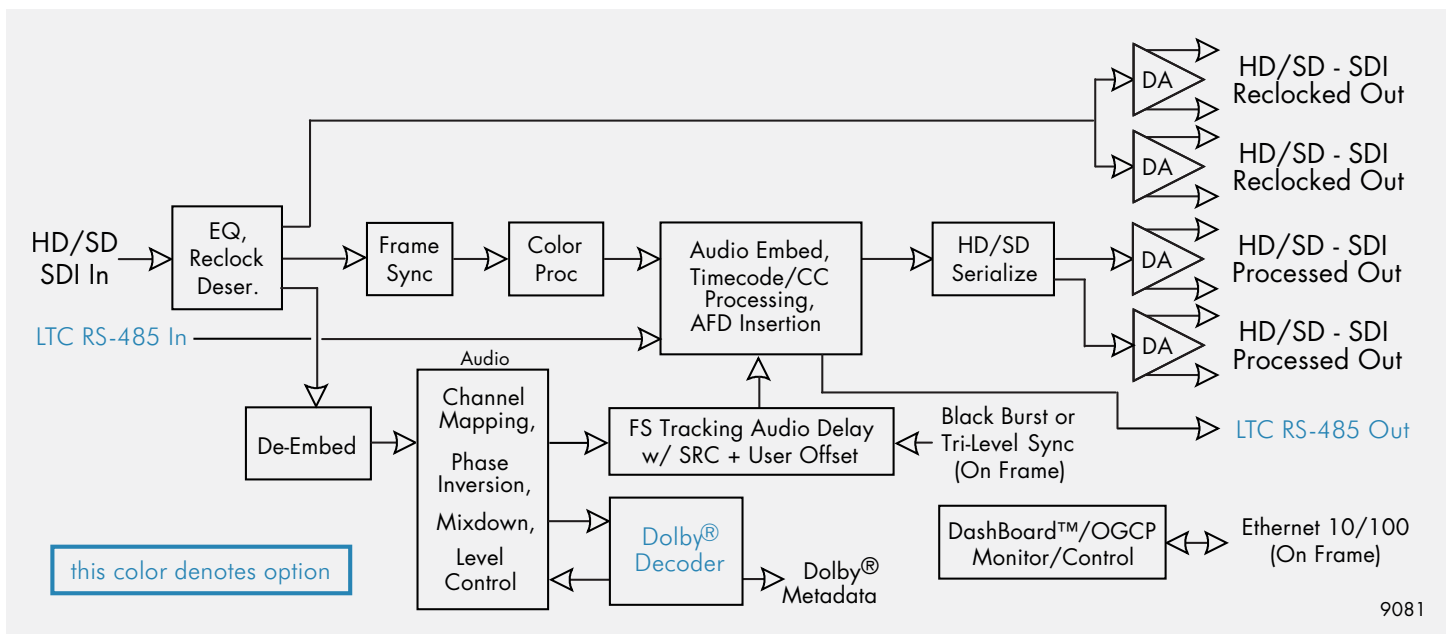
AFD code insertion

Local or remote user configuration and processing controls

Glitch-free handling of embedded audio when a frame is dropped or duplicated
Four internal tone generators

Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel

Five-year warranty



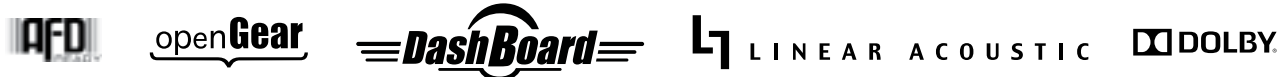
» ORDERING INFORMATION

9081 HD/SD Frame Sync with Input Reclocking and Glitchless Embedded Audio Support

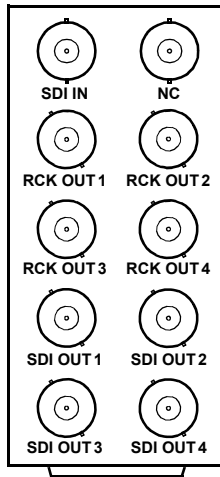
RM20-9081-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs

RM20-9081-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs per card, 2 HD/SD-SDI Processed Outputs per card

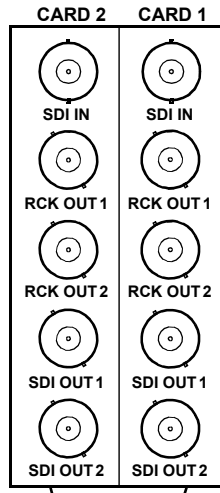
RM20-9081-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs, RS-485 LTC / Metadata I/O Port



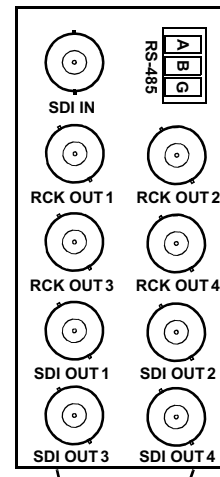
9081



RM20-9081-A



RM20-9081-A/S



RM20-9081-B

» SPECIFICATIONS

Electrical

Power: 9 watts
 Power (Dolby® +DEC Option): 11.5 watts

HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 292 and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
 Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Processing Delay

Minimum Frame Sync Delay: < 3 lines

HD/SD-SDI Output

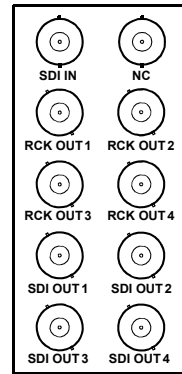
Number of Outputs: 4 reclocked
 4 processed
 Standard: SMPTE 292 and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz
 Jitter: HD: < 0.15 UI
 SD: < 0.10 UI
 Embedded Audio: 16-Ch SD/HD

9082 » HD/SD FRAME SYNC

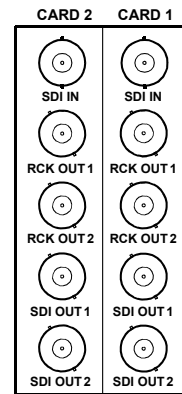
with Input Reclocking



The 9082 is a video-only HD/SD frame sync that passes the entire ancillary data interval, including embedded audio. Because the 9082 does not have tracking embedded audio delay found on the 9081/9083, noticeable audio glitches may occur when processing asynchronous inputs.



RM20-9082-A



RM20-9082-A/S

» FEATURES

Frame sync with up to 13 frames of user adjustable delay

Local or remote user configuration and processing controls

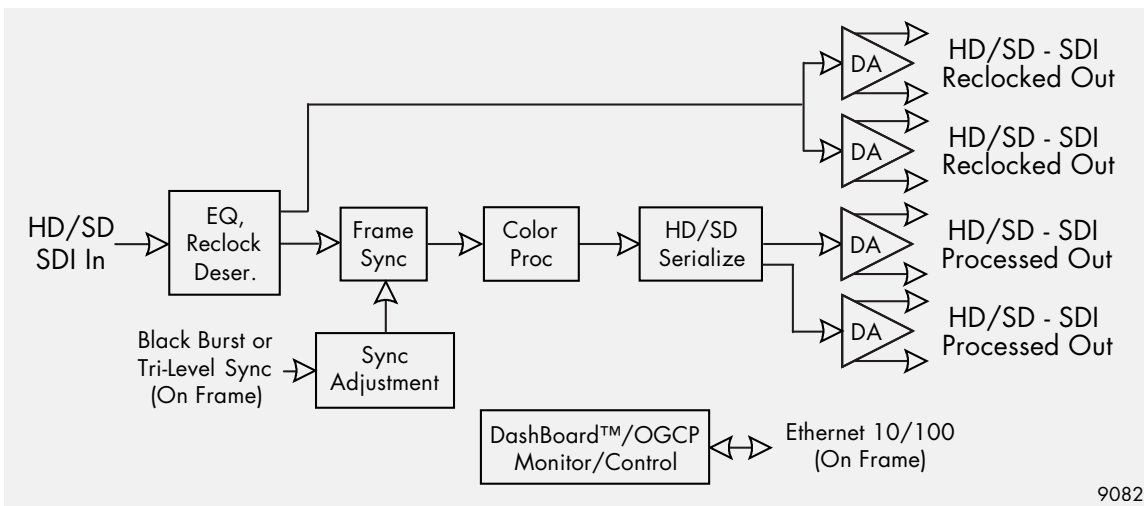
Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panel

Video level controls

Timecode insertion/conversion

Five-year warranty

AFD code insertion



9082

» SPECIFICATIONS

Electrical

Power: 8 watts

HD/SD-SDI Input

Number of Inputs: 1
Standard: SMPTE 292 and 259M
Return Loss: >15 dB at 5 MHz - 1.485 GHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Processing Delay

Minimum Frame Sync Delay: < 3 lines

HD/SD-SDI Output

Number of Outputs: 4 reclocked, 4 processed
Standard: SMPTE 292 and 259M
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 270 MHz, >12 dB at 270 MHz - 1.485 GHz
Jitter: HD: < 0.15 UI, SD: < 0.10 UI
Embedded Audio: 16-Ch SD/HD (Passthrough)

» ORDERING INFORMATION

9082 HD/SD-SDI Frame Sync with Input Reclocking

RM20-9082-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs

RM20-9082-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs per card, 2 HD/SD-SDI Processed Outputs per card



9083 » HD/SD FRAME SYNC with Audio Embedding/De-Embedding

OPTIONS

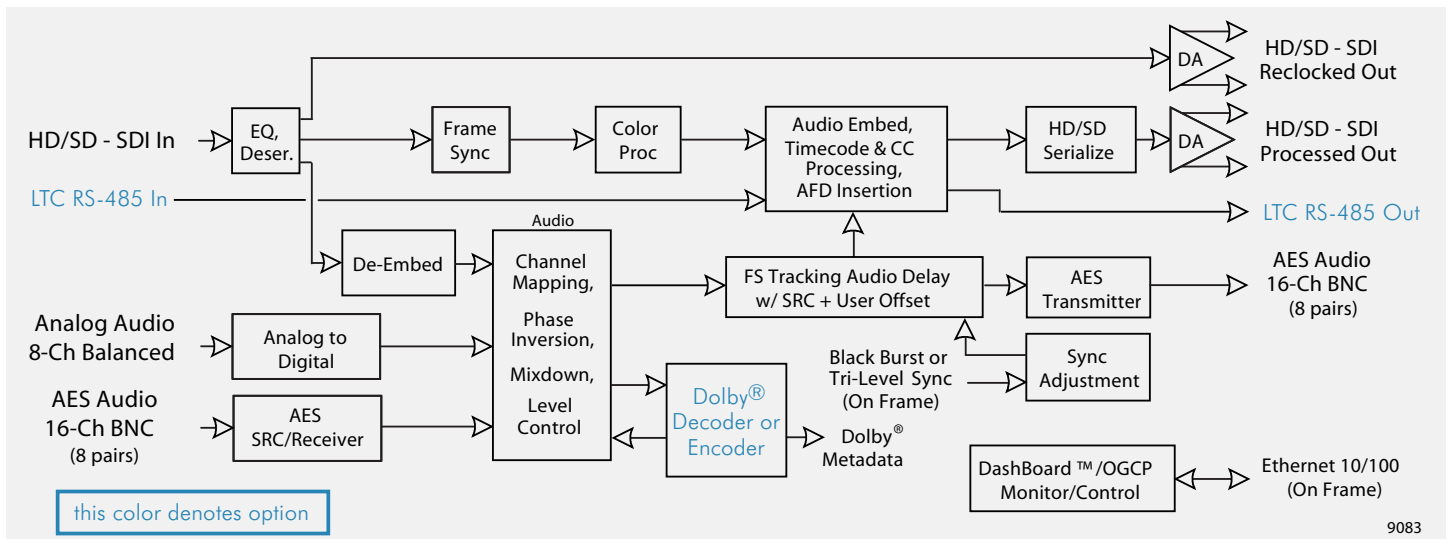
Dolby® Digital/E Decoding (+DEC), Dolby® Digital AC-3 Encoding (+ENCD), Dolby® E Encoding (+ENCE), Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC)



The 9083 offers full-featured frame sync, providing glitch-free audio embedding from embedded, AES, and analog input sources with full embed/de-embed crosspoint and level control. Up to 16 AES channels and eight analog audio channels can be embedded. De-embedding provides up to 16 AES channels.

» FEATURES

HD/SD universal digital inputs	AFD code insertion	Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding	Frame sync with up to 13 frames of user adjustable delay
Video level controls	Timecode insertion/conversion. +LTC option allows LTC input/output on shared port, with bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.	Four internal tone generators	Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panel
Dolby® Digital/E Decoder or Encoder options with metadata output	Glitch-free handling of embedded audio when a frame is dropped or duplicated	HD/SD closed captioning support and flexible timecode processing	Five-year warranty
User-defined audio offset can be applied in frame sync to align Dolby® delay			



9083

» ORDERING INFORMATION

9083 HD/SD-SDI Frame Sync with Input Reclocking, Glitchless Embedded Audio Support, and 16 Channel AES Embedding/De-Embedding

RM20-9083-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs, AES BNCs: 4 In/Out, 2 HD/SD-SDI Output BNCs

RM20-9083-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input, 1 HD/SD-SDI Reclocked Output per card, AES BNCs: 2 In/Out per card, 1 HD/SD-SDI Output BNC per card

RM20-9083-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 6 Analog Audio Inputs, 2 HD/SD-SDI Output BNCs

RM20-9083-C 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input, AES BNCs: 2 In, 4 In/Out, 2 Out, 8 Analog Audio Inputs, 2 HD/SD-SDI Output BNCs

RM20-9083-D 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI In, AES BNCs: 4 In/Out, 2 Out, 8 Analog Audio In, 2 HD/SD-SDI Out BNCs, RS-485 LTC / Metadata I/O Port

RM20-9083-E 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input, AES BNCs: 4 In/Out, 2 In, 8 Out, RS-485 LTC / Metadata I/O Port, 2 HD/SD-SDI Output BNCs

RM20-9083-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, High Density) HD/SD-SDI Input, 8 AES Inputs, 8 AES Outputs, 2 HD/SD-SDI Outputs, 1 Reclocked HD/SD-SDI Output (All connectors HD-BNC)

RM20-9083-E-DIN 20-Slot Frame Rear I/O Module (Standard Width, High Density) HD/SD-SDI Input, 8 AES Inputs, 8 AES Outputs, 2 HD/SD-SDI Outputs, 1 Reclocked HD/SD-SDI Output (All connectors DIN1.0/2.3)

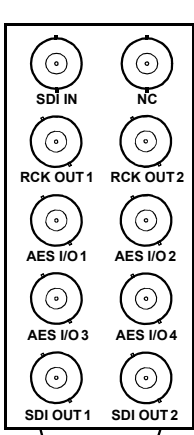
RM20-9083-F 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, AES BNCs: 4 In/Out, 2 Out, 2 HD/SD-SDI Output BNCs

RM20-9083-G 20-Slot Frame Rear I/O Module (Triple Width) HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs, 8 AES In BNCs, 8 AES Out BNCs, 8 Analog Audio In BNCs, and 2 HD/SD-SDI Output BNCs

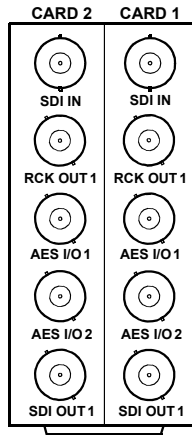
RM20-9083-H 20-Slot Frame Rear I/O Module (Double Width) Digital Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 8 AES Out BNCs, and 2 SDI Output BNCs

RM20-9083-J 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 AES BNC In/Out, 2 HD/SD-SDI Reclocked Outputs, 2 HD/SD-SDI Processed Outputs, RS-485 LTC / Metadata I/O Port

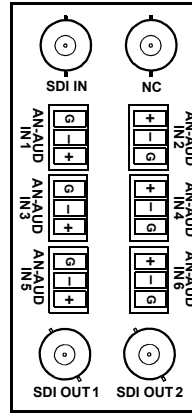
9083 » REAR MODULE OPTIONS



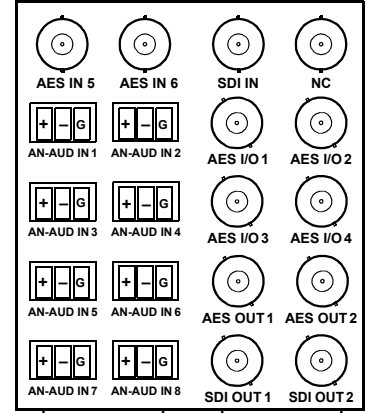
RM20-9083-A



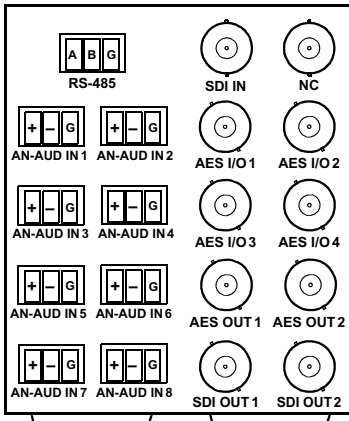
RM20-9083-A/S



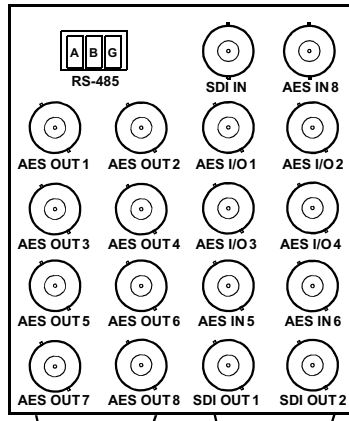
RM20-9083-B



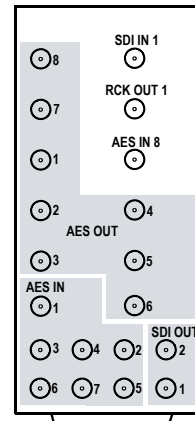
RM20-9083-C



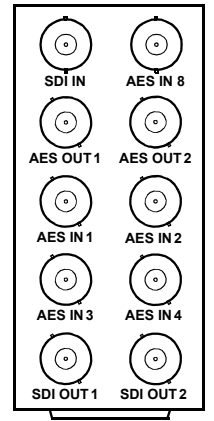
RM20-9083-D



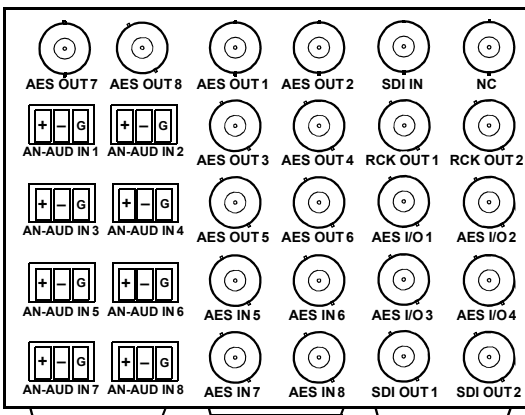
RM20-9083-E



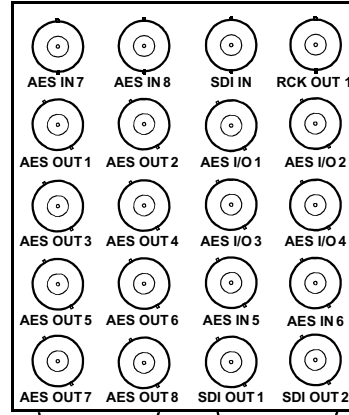
RM20-9083-E-DIN-HDBNC



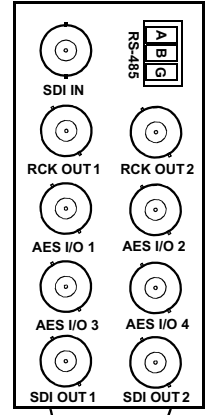
RM20-9083-F



RM20-9083-G



RM20-9083-H



RM20-9083-J

9083

SPECIFICATIONS

Electrical

Power: 12 watts
 Power (Dolby® +DEC Option): 14.5 watts

HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 292 and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz

AES Input

Number of Inputs: 16-Ch unbalanced BNC
 (nominal 48 kHz only)
 Impedance: 75 Ω
 Input Level: 0.1 V to 2.5 V p-p
 (5 V p-p tolerant)
 Resolution: 24-bit

Analog Audio Input

Number of Inputs: 8-Ch balanced
 Connector: Removable 3-pin Phoenix
 Signal Level: up to +24 dBu
 Sample Rate: 48 kHz

Reference Video Input

Number of Inputs: 2 looping
 (openGear® frame)
 Standard: Tri-level sync (SMPTE 274)
 & black burst (NTSC & PAL)

Processing Delay

Minimum Frame Sync Delay: < 3 lines

AES-3ID Output

Number of Outputs: 16-Ch unbalanced BNC
 Impedance: 75 Ω
 Sample Rate: 48 kHz
 Resolution: 24-bit

HD/SD-SDI Output

Number of Outputs: 2
 Standard: SMPTE 292 and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 270 MHz
 >12 dB at 270 MHz - 1.485 GHz
 Jitter: HD: < 0.15 UI
 SD: < 0.10 UI
 Embedded Audio: 16-Ch SD/HD



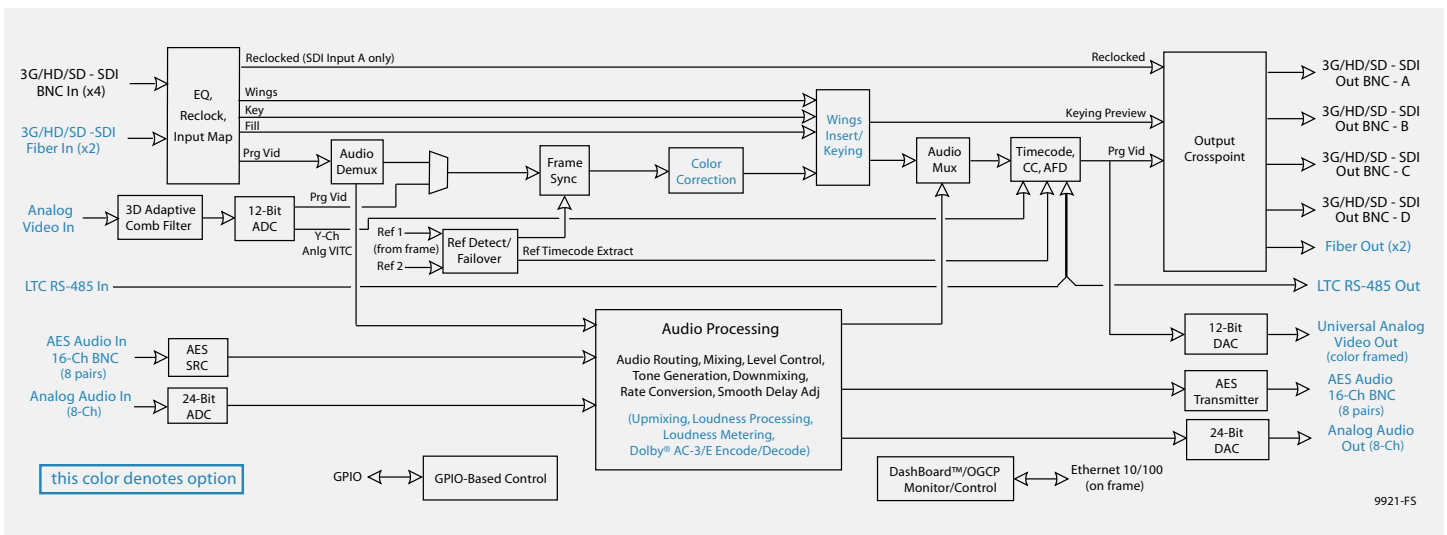
9921-FS » 3G/HD/SD FRAME SYNC



The award-winning 3G/HD/SD Fusion3G® 9921-FS card offers frame sync, and advanced audio and ancillary data support, plus many other powerful features.

Frame sync can select from multiple reference inputs, with failover to alternate selected sources. Full audio support includes per-channel audio delay. Remote control is quick and easy with the free DashBoard™ remote control software or the Cobalt OGCP-9000 remote control panels.

You can select from options to add (as inputs and/or outputs) fiber, analog video, AES and analog audio. Other options include wings insertion, general purpose keying, color correction, Dolby® E/AC-3 encoding and decoding (with both decode and re-encode on the same card), ITU/ATSC/EBU compliant loudness metering, and Linear Acoustic® upmixing and loudness processing.



» STANDARD FEATURES

Full 3G/HD/SD-SDI support on BNC coax
 Per-channel audio delay with glitchless delay adjustment
 Frame sync with reference failover using dual reference inputs on frame

Full SMPTE timecode support with translation between formats. Timecode sources selectable from SDI and analog video inputs, reference, and internally generated.

Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features

GPIO ports with user-definable functions for system automation and monitoring

Centralized GUI remote control using DashBoard™ software and Cobalt OGCP-9000 remote control panels – custom settings saved as presets can be recalled manually, or with GPI or events-based triggerings

Five-year warranty

» OPTIONAL FEATURES

Fiber 3G/HD/SD inputs/outputs. Fiber ports use blind mating interface, allowing card swapping (including optical transceivers) with no cable disconnection.

Analog audio I/O

Wings insertion and general purpose keying feature

LTC input/out and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O

Relay bypass available from SDI input to SDI output

Universal HD/SD analog I/O. Composite video input sources converted with 3D comb decoder, mitigating common decoding artifacts. Composite video output is color-framed to match reference burst, plus user offset.

AES embedding/de-embedding. AES ports are GUI selectable as input or output. Each input has independent sample rate converter.

Linear Acoustic® loudness processing and automatic upmixer technology

Full Dolby® E / AC-3 encoding and decoding options, including decode + re-encode and multiple AC-3 stream encoding on the same card.



9921-FS » OPTIONS

» I/O OPTIONS

16 CHANNEL AUDIO EMBEDDING/DE-EMBEDDING (+AES)

Provides eight (total) AES pair BNC connections that can be GUI-configured as inputs or outputs. Independent SRC for all AES inputs, with auto and manual bypass for non-PCM data.

8-PORT AES OUTPUT EXPANSION (+AES16)

Provides the 16-channel embed/de-embed of option +AES (see above) as well as eight added AES output ports to provide a total complement of AES I/O 1 thru AES I/O 8 and added ports AES OUT 1 thru AES OUT 8. Allows 16 channels of AES embedding and 16 channels of AES de-embedding simultaneously. (Option is not available as a field upgrade and also requires Rear I/O Module RM20-9921-G.)

LTC RS-485/AUDIO INPUT/OUTPUT (+LTC)

Provides LTC input/output and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.

FIBER INPUTS/OUTPUTS (+FRX / +FTX / +FRXTX / +FRXRX / +FTXTX)*

Provides one or two fiber connections per card. Inputs can serve any function in the product, outputs can be assigned from any function in the card. Connector type is dual LC with blind-mate connectors. Cards are fully swappable.

UNIVERSAL ANALOG VIDEO INPUTS/OUTPUTS (+ANV)*

Provides an analog video input and output (CVBS, component, RGB (sync on green))

ANALOG AUDIO INPUTS/OUTPUTS (+ANA)*

Provides up to eight channels (total) of balanced analog audio inputs and outputs

*Requires expansion Rear Module (for example, 9921-FS+ANV requires RM20-9921-XB expansion Rear Module)

» VIDEO OPTIONS

WINGS INSERTION (+WINGS)

Provides wings insertion using an independent SDI input provided for wings signal. Provides programmable insertion width.

KEYING (+KEYER)

Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output.

Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

COLOR CORRECTION (+COLOR)

Provides independent RGB channel controls for luma, black, and gamma. Ultra-fast response time. The color correction feature is perfectly suited for use with Cobalt OGCP-9000/CC Remote Control Panel.

FRAME BUFFER EXPANSION (+MEM)

Increases the independently adjustable audio and video delay buffer capacity to 47 seconds for SD video, 8 seconds for HD video, or 4 seconds for 3G video. (+MEM is a hardware-based option and is not available as a field upgrade. This option is displayed as "+2GB" on the DashBoard card info pane.)

» AUDIO OPTIONS

LINEAR ACOUSTIC® LOUDNESS PROCESSING (+LP51/+LP20)*

Featuring Linear Acoustic® AEROMAX® technology and available in 5.1-channel (LP51) and stereo (LP20) configurations. These loudness processors use inputs from any source received by the card, or any mixing setting produced by the card. AEROMAX® algorithms use a sophisticated multi-band approach to loudness processing, and can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible.

Up to two 5.1 loudness processors can be ordered per card, order as +LP51A and +LP51B. Up to four stereo loudness processors can be ordered per card, order as +LP20A, +LP20B, +LP20C and +LP20D.

LINEAR ACOUSTIC® AUTOMATIC UPMIXER (+UM)*

Featuring Linear Acoustic® UPMAX™ technology, upmixing allows legacy stereo program content to be converted to full 5.1-channel audio. UPMAX™ mode detects 2.0 content and automatically applies upmix mode (with configurable switchover fade-in/fade-out) depending on absence or presence of 5.1 source audio.

Up to two upmixers may be configured on the card, order as +UMA and +UMB.

SOFTWARE LOUDNESS METER (+LM-C)

Cobalt's +LM audio loudness metering option (in conjunction with a Cobalt OGCP-9000 Remote Control Panel with +LM-P option) provides a flexible solution for ingest or on-air loudness metering and assessment in compliance with ITU/ATSC/EBU standards. Easy to use, the +LM offers "true peak" level detection, error tracking and logging, and intuitive interface with touch screen control.

AUDIO FAILOVER (+AFO)

Provides automatic failover to alternate ("secondary") channels to substitute for the primary channels in the event of audio signal loss.

AUTO DOWNMIX (+ADM)

Provides automatic Stereo downmix from selected alternate multi-channel sources if primary Stereo channels lose signal.

DOLBY® DIGITAL/DIGITAL PLUS™ ENCODING (+ENCD)

Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card. Up to four independent encoders - all on the same card - can be included (+ENCDA thru +ENCDD). This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

DOLBY® E/DIGITAL/DIGITAL PLUS™ DECODING (+DEC)

Decodes Dolby® E, Digital, and Digital Plus™ signals from AES or embedded sources. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

DOLBY® E ENCODING (+ENCE)

Provides Dolby® E encoding from any combination of audio sources supported by the card. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

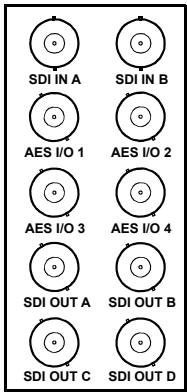
DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENC DVS)

Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus™ encoding. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

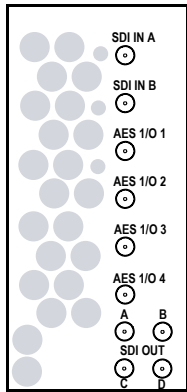
*The following Processing/Upmixing combinations, and their subsets, are available. Contact sales for more information.

- Upmixer, 5.1 Processor, Aux Stereo Processor (+UMA, +LP51A, +LP20A)
- Two stereo processors, Two upmixers (+LP20A, +LP20B, +UMA, +UMB)
- Two 5.1 loudness processors (+LP51A, +LP51B)
- Four stereo loudness processors (+LP20A, +LP20B, +LP20C, +LP20D)

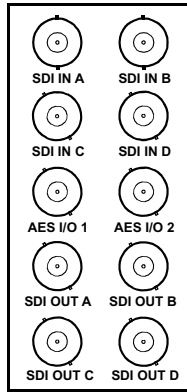
9921-FS



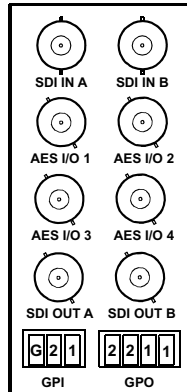
RM20-9921-B



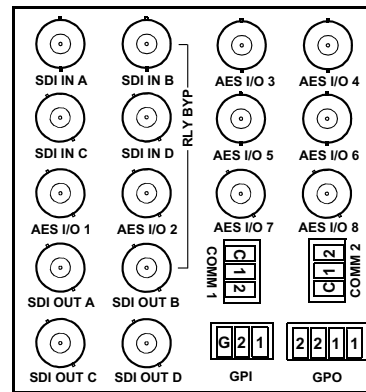
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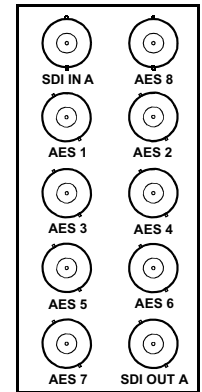
RM20-9921-C



RM20-9921-D

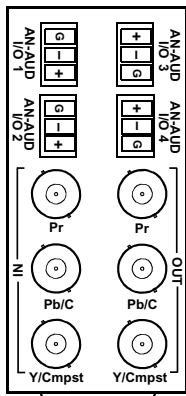


RM20-9921-E

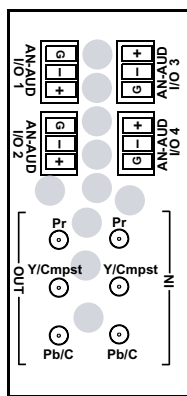


RM20-9921-F

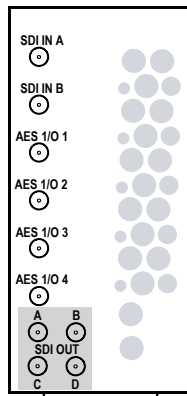
EXPANSION REAR I/O MODULES



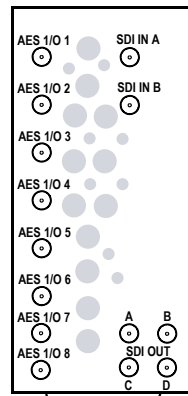
RM20-9921-XB



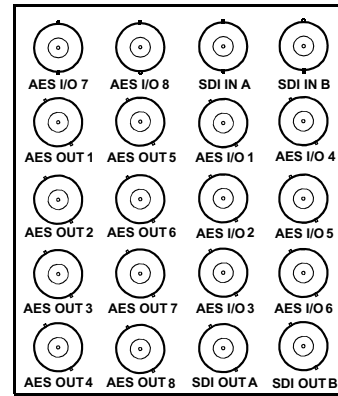
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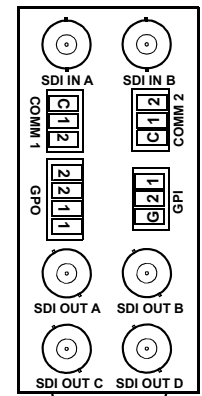
RM20-9921-F-HV2



RM20-9921-F-HV

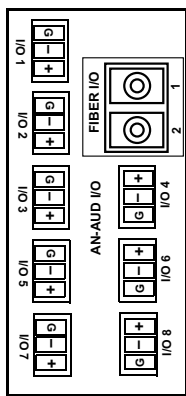


RM20-9921-G

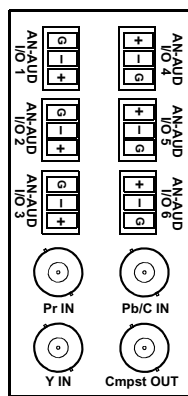


RM20-9921-H

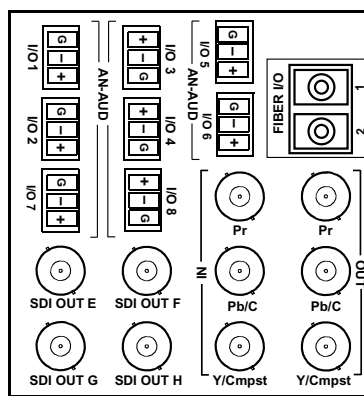
Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3C® card when equipped with these options. Expansion Rear I/O Modules are identified with an "X" in the part number and must be used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 3)



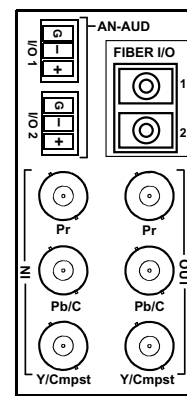
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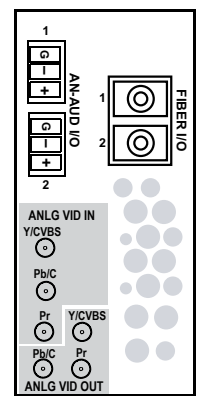
RM20-9921-XD



RM20-9921-XE



RM20-9921-XF



RM20-9921-XF-HV

9921-FS

ORDERING INFORMATION

9921-FS 3G/HD/SD Frame Sync

BASE REAR I/O MODULES

Base Rear I/O Modules provide connections for standard card BNC video and audio connections, as well as other connections depending on rear module part number. These modules mate directly with the Fusion3G® card.

RM20-9921-B 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Input, 4 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9921-B-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9921-B-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9921-C 20-Slot Frame Rear I/O Module (Standard Width) 4 3G/HD/SD-SDI Inputs, 2 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9921-D 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Inputs, 4 AES I/O BNCs, 2 GPIO, 2 3G/HD/SD-SDI Outputs

RM20-9921-E 20-Slot Frame Rear I/O Module (Double Width) 4 3G/HD/SD-SDI Inputs (1 with Relay Bypass), 8 AES I/O BNCs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI Outputs

RM20-9921-F 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 1 3G/HD/SD-SDI Output

RM20-9921-F-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9921-F-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9921-F-HV2-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) (2) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors DIN 1.0.2.3)

RM20-9921-F-HV2-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) (2) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors HD-BNC)

RM20-9921-G 20-Slot Frame Rear I/O Module (Double Width) 2 3G/HD/SD-SDI Inputs, 8 AES I/O BNCs, 8 additional AES Outputs, 2 3G/HD/SD-SDI Outputs (Available only in conjunction with card option +AES16)

RM20-9921-H 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI BNC Inputs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI BNC Outputs

EXPANSION REAR I/O MODULES

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an “-X” in the part number and must be used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 3)

RM20-9921-XB 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9921-XB-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9921-XB-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9921-XC 20-Slot Frame Rear I/O Module (Standard Width) 2 Fiber I/O, 8 Analog Audio I/O

RM20-9921-XD 20-Slot Frame Rear I/O Module (Standard Width) Component In, 6 Analog Audio I/O, Composite Out

RM20-9921-XE 20-Slot Frame Rear I/O Module (Double Width) Component In, 2 Fiber I/O, 8 Analog Audio I/O, Component Out, 4 3G/HD/SD-SDI Outputs

RM20-9921-XF 20-Slot Frame Rear I/O Module (Standard Width) Component In, 2 Fiber I/O, 2 Analog Audio I/O, Component Out

RM20-9921-XF-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are DIN1.0/2.3) This Rear I/O Module must be used with an HV Base Rear I/O Module.

RM20-9921-XF-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are HD-BNC) This Rear I/O Module must be used with an HV Base Rear I/O Module.

9922-2FS » 3G/HD/SD-SDI DUAL-CHANNEL FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O



The all-new Cobalt® 9922-2FS 3G/HD/SD-SDI Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O offers *two independent signal paths* of framesync / audio embedding and de-embedding on a single open-Gear® card. Using our HPF-9000 20-slot frame, this provides up to 40 channels of processing in a single frame. 9922-2FS represents a whole new level of openGear packaging density!

Advanced framesync features include per-channel audio delay, audio/video offset, and output rate conversion to and from 23.98/29.97/29.94 to 24/30/60 frame rates. Frame sync can select from multiple reference inputs, with failover to alternate selected sources. Each path can independently use either of two frame references or internal reference.

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair. Bulk and per-channel audio delay controls easily address lip-sync issues.

A convenient input crosspoint with RP168 clean switching can select from up to four SDI inputs to be applied to either of the card's two processing paths. The input crosspoint allows manual selection of input via remote control or GPIO, or failover to alternate inputs on loss of input conditions. For each path, two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Moving-box insertion can be enabled to serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

The space-saving design of the 9922-2FS provides for high density, allowing two cards to be collocated in adjacent slots and served by a single, standard width "split" rear module. This provides four video paths per each pair of slots, readily providing 20 channels of processing in only 10 slots. Two independent paths with fully independent user delays is perfect for setting up path delays for key/fill video.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Two independent processing paths per card – 20 channels of processing in only 10 slots

Multi-input RP168 clean switch, with manual selection or GPI controlled input selection

Closed-captioning absence detection

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides alert actions on criteria such as black/frozen frame, audio silence, and closed-captioning absence. Threshold and hold-off are user configurable.

Moving-box insertion serves as a dynamic raster confidence check even in cases where the input video image is static

Framesync with full H/V offset and manual/LOS video pattern generator

Per-path dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

CVBS analog video I/O and analog/AES embed / de-embed with 4-line Adaptive Comb Filter

Video options include color correction and keying

Pattern generator for each channel can provide raster/test pattern and patterns for LOS failover insertion

Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty

OPTIONS

Quality Check (+QC). Provides failover on criteria such as black/frozen frame, audio silence, and CC absence.

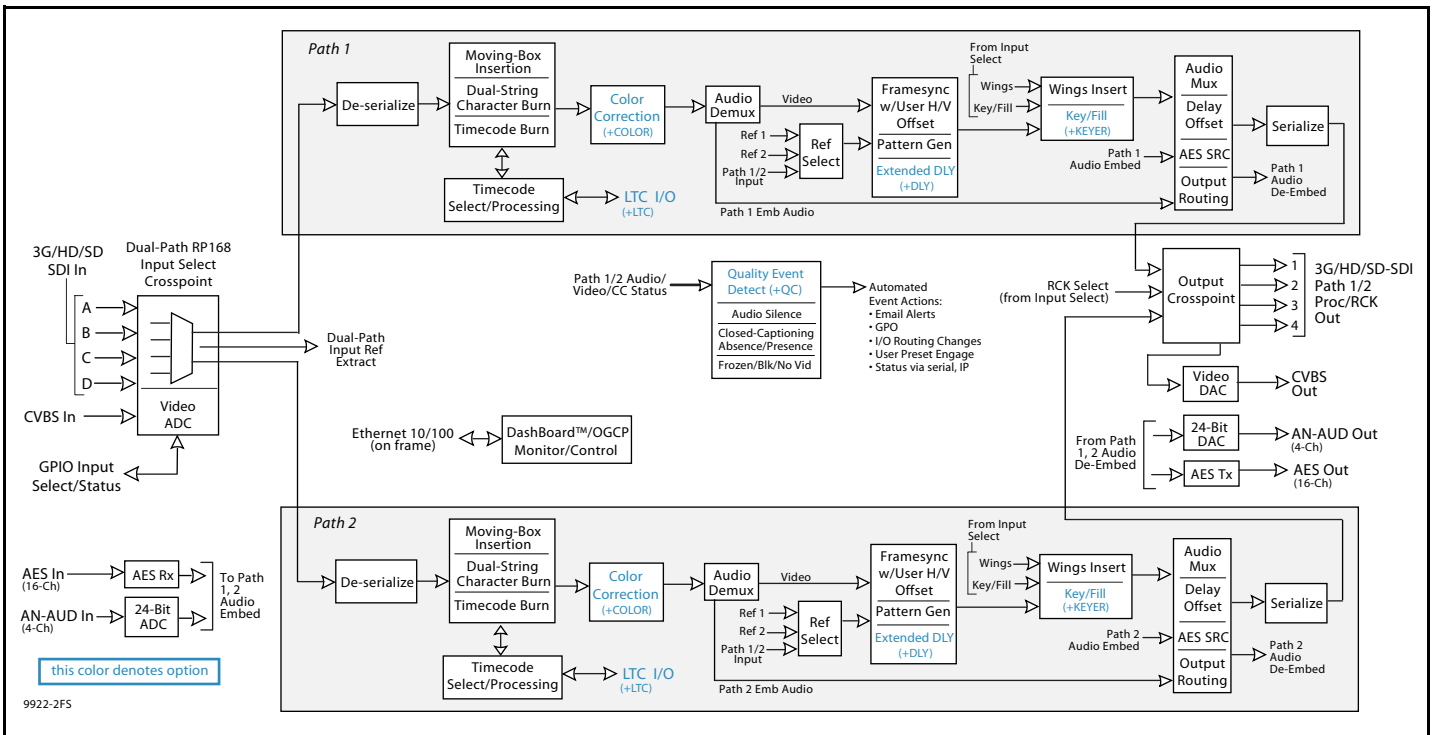
Key/Fill Keyer (+KEYER). Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

Color Correction (+COLOR). Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

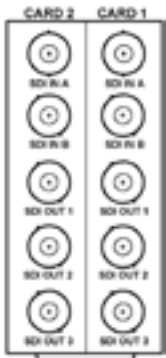
Expanded Delay (+DLY). Allows framesync frame delay up to 390 frames.

Audio LTC I/O (+LTC)

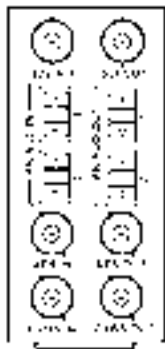
9922-2FS



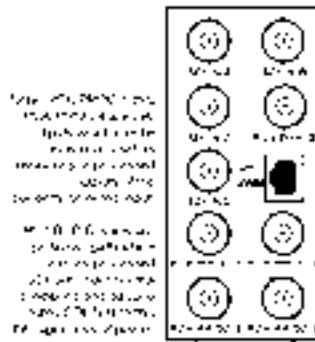
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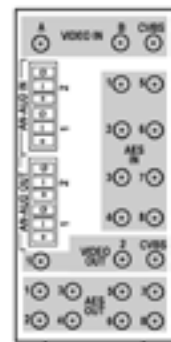
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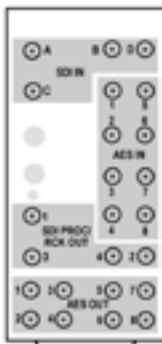
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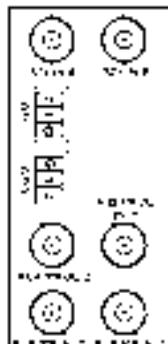
RM20-9922-2FS-C



RM20-9922-2FS-D-DIN
RM20-9922-2FS-D-HDBNC



RM20-9922-2FS-E-DIN
RM20-9922-2FS-E-HDBNC



RM20-9922-2FS-F



RM20-9922-2FS-G



9922-2FS

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs (selectable as processed SDI Path 1 or Path 2, or selected input relocked)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input

(1) 75Ω BNC output (selectable as Path 1 or Path 2 processed output). CVBS output functional only when selected path is carrying SD-SDI.

ADC resolution: 9-bit

Sampling frequency: 27 MHz (2x over-sampling)

Y/C separation: 4 line Adaptive Comb Filter

Freq. Response: ± 0.25 dB to 5.5 MHz

SNR: > 50 dB to 5.5 MHz (unweighted)

Differential Phase: < 1 degree

Differential Gain: < 1%

Nonlinearity < 1%

Discrete Audio Input/Outputs

AES-3id 75? inputs (8 pair (16-Ch) max)

AES-3id 75? outputs (8 pair (16-Ch) max)

Input AES SRC Range: 32 to 96 kHz

Balanced analog audio inputs (4-Ch max)

Balanced analog audio outputs (4-Ch max)

(I/O conforms to 0 dBFS = +24 dBu)

Analog Output Impedance: < 50 Ω

Analog Reference Level: -20 dBFS

Analog Nominal Level: +4 dBu

Analog Max Output Level: +24 dBu (0 dBFS)

Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

Analog SNR: 115 dB (A weighted)

Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)

Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Framesync Audio/Video Delay

Standard max offset: 20 frames

Option +DLY max offset: 390 frames (1077 ms / 2161 ms / 11500 ms (3G / HD / SD)

Latency (min): 1 frame

Timecode Insertion/Burn-In

Per-path burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings per path supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus or selected program video ref sources. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level".

Return Loss: >35 dB up to 5.75 MHz

9922-2FS

ORDERING INFORMATION

9922-2FS 3G/HD/SD-SDI Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O

RM20-9922-2FS-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per Card 1 and Card 2 connector banks)

RM20-9922-2FS-B 20-Slot Frame Rear I/O Module (Standard-Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SD-SDI Output BNCs, (1) CVBS Processed Out BNC, (2) Balanced Analog Audio Outputs

RM20-9922-2FS-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), (1) GPIO/COMM RJ-45 connector

RM20-9922-2FS-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9922-2FS-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9922-2FS-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9922-2FS-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC.)

RM20-9922-2FS-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9970-2FS-G 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs, COMM/GPIO Port, Ethernet Port

+DLY Extended Delay Option

+QC Quality Check Option

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

9922-FS » 3G/HD/SD-SDI FRAME SYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS)



The new for 2015 Cobalt® 9922-FS 3G/HD/SD-SDI Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O offers frame sync, and advanced audio and ancillary data support, plus many other powerful features. Frame sync can select from multiple reference inputs, with failover to alternate selected sources. Full audio support includes per-channel audio delay. With software upgrade option+2FS, a second independent processing path can be added, offering two independent signal paths of framesync / audio embedding and de-embedding on a single open-Gear® card.

Advanced framesync features include per-channel audio delay, audio/video offset, and output rate conversion to and from 23.98/29.97/29.94 to 24/30/60 frame rates. Frame sync can select from multiple reference inputs, with failover to alternate selected sources. Each path can independently use either of two frame references or internal reference.

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is

detected on an input pair. Bulk and per-channel audio delay controls easily address lip-sync issues.

A convenient input crosspoint with RP168 clean switching can select from up to four SDI inputs. The input crosspoint allows manual selection of input via remote control or GPIO, or failover to alternate inputs on loss of input conditions. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Multi-input RP168 clean switch, with manual selection or GPI controlled input selection

Closed-captioning absence detection

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides alert actions on criteria such as black/frozen frame, audio silence, and closed-captioning absence. Threshold and hold-off are user configurable.

Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static

Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Framesync with full H/V offset and manual/LOS video pattern generator

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

CVBS analog video I/O and analog/AES embed / de-embed available

Pattern generator can provide raster/test pattern and patterns for LOS failover insertion

Video options include color correction and keying

Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty

OPTIONS

Dual-Channel Option (+2FS). Adds a second independent processing path, offering two independent signal paths of framesync / audio embedding and de-embedding on a single open-Gear® card. (Upgrades card to full 9922-2FS functionality and specifications.)

Quality Check (+QC). Provides failover on criteria such as black/frozen frame, audio silence, and CC absence.

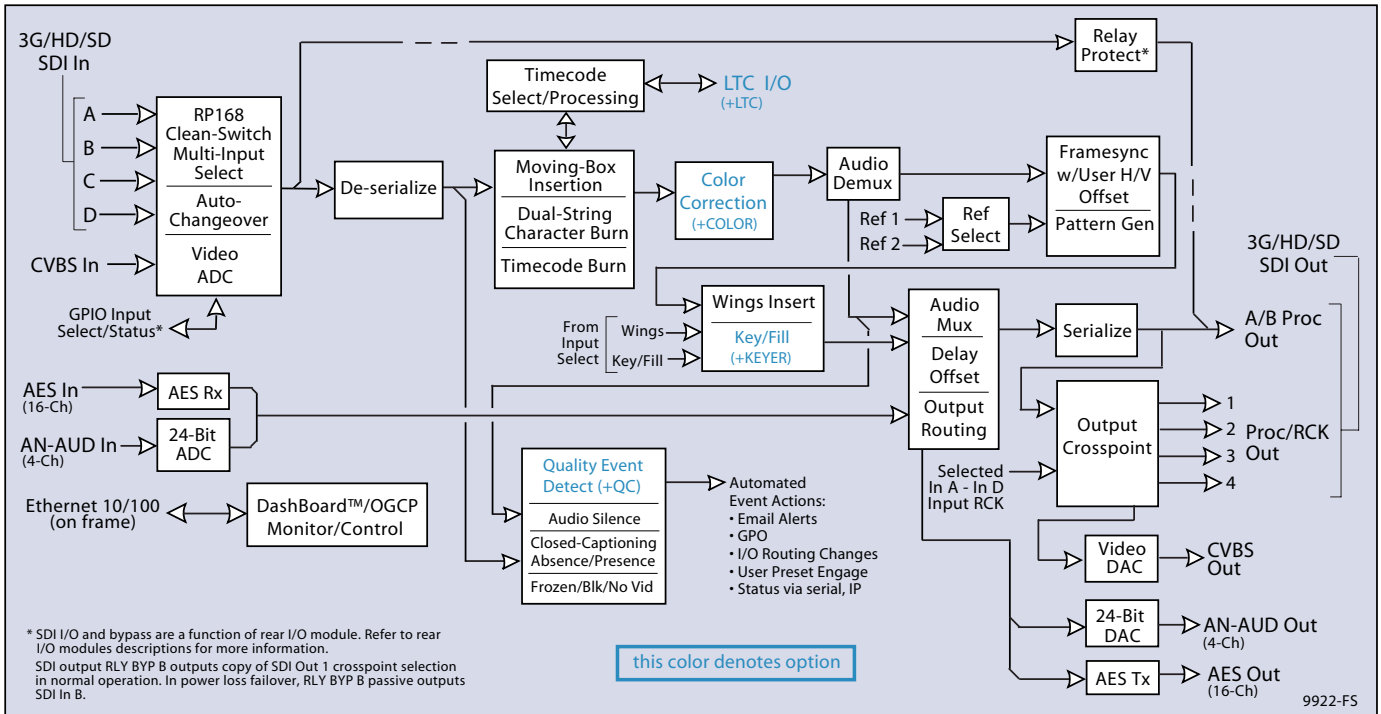
Expanded Delay (+DLY). Allows framesync frame delay up to 390 frames.

Key/Fill Keyer (+KEYER). Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

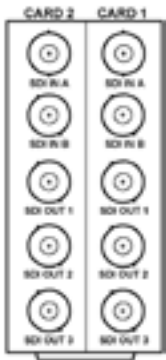
Audio LTC I/O (+LTC)

Color Correction (+COLOR). Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

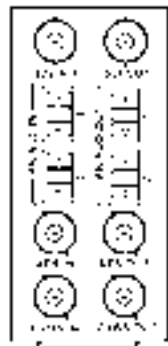
9922-FS



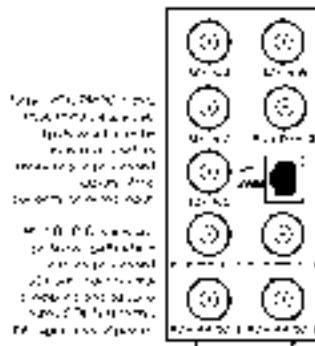
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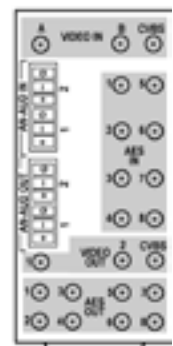
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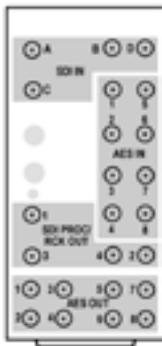
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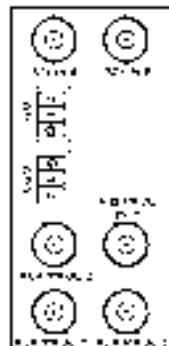
RM20-9922-FS-C



RM20-9922-FS-D-DIN
RM20-9922-FS-D-HDBNC



RM20-9922-FS-E-DIN
RM20-9922-FS-E-HDBNC



RM20-9922-FS-F



RM20-9922-FS-G



9922-FS

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input

(1) 75Ω BNC output (selectable as Path 1 or Path 2 processed output). CVBS output functional only when selected path is carrying SD-SDI.

ADC resolution: 9-bit

Sampling frequency: 27 MHz (2x over-sampling)

Y/C separation: 4 line Adaptive Comb Filter

Freq. Response: ± 0.25 dB to 5.5 MHz

SNR: > 50 dB to 5.5 MHz (unweighted)

Differential Phase: < 1 degree

Differential Gain: < 1%

Nonlinearity < 1%

Discrete Audio Input/Outputs

AES-3id 75? inputs (8 pair (16-Ch) max)

AES-3id 75? outputs (8 pair (16-Ch) max)

Input AES SRC Range: 32 to 96 kHz

Balanced analog audio inputs (4-Ch max)

Balanced analog audio outputs (4-Ch max)

(I/O conforms to 0 dBFS = +24 dBu)

Analog Output Impedance: < 50 Ω

Analog Reference Level: -20 dBFS

Analog Nominal Level: +4 dBu

Analog Max Output Level: +24 dBu (0 dBFS)

Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

Analog SNR: 115 dB (A weighted)

Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)

Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Framesync Audio/Video Delay

Standard max offset: 20 frames

Option +DLY max offset: 390 frames (1077 ms / 2161 ms / 11500 ms (3G / HD / SD))

Latency (min): 1 frame

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level".

Return Loss: >35 dB up to 5.75 MHz

9922-FS

ORDERING INFORMATION

9922-FS 3G/HD/SD-SDI Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS)

RM20-9922-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per Card 1 and Card 2 connector banks)

RM20-9922-FS-B 20-Slot Frame Rear I/O Module (Standard-Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNC, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SD-SDI Output BNCs, (1) CVBS Processed Out BNC, (2) Balanced Analog Audio Outputs

RM20-9922-FS-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), (1) GPIO/COMM RJ-45 connector

RM20-9922-FS-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9922-FS-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9922-FS-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9922-FS-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC.)

RM20-9922-FS-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9970-FS-G 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs, COMM/GPIO Port, Ethernet Port

+2FS Add Dual-Channel Option

+DLY Extended Delay Option

+QC Quality Check Option

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

9085 » LOUDNESS PROCESSOR WITH EMBEDDER/DE-EMBEDDER

OPTIONS

Dolby® Decoding (+DEC), Dolby® Digital AC-3 Encoding (+ENCD), Dolby® E Encoding (+ENCE), Audio Mixing (+AMx), Loudness Metering (+LM-C), LTC In/Out (+LTC)

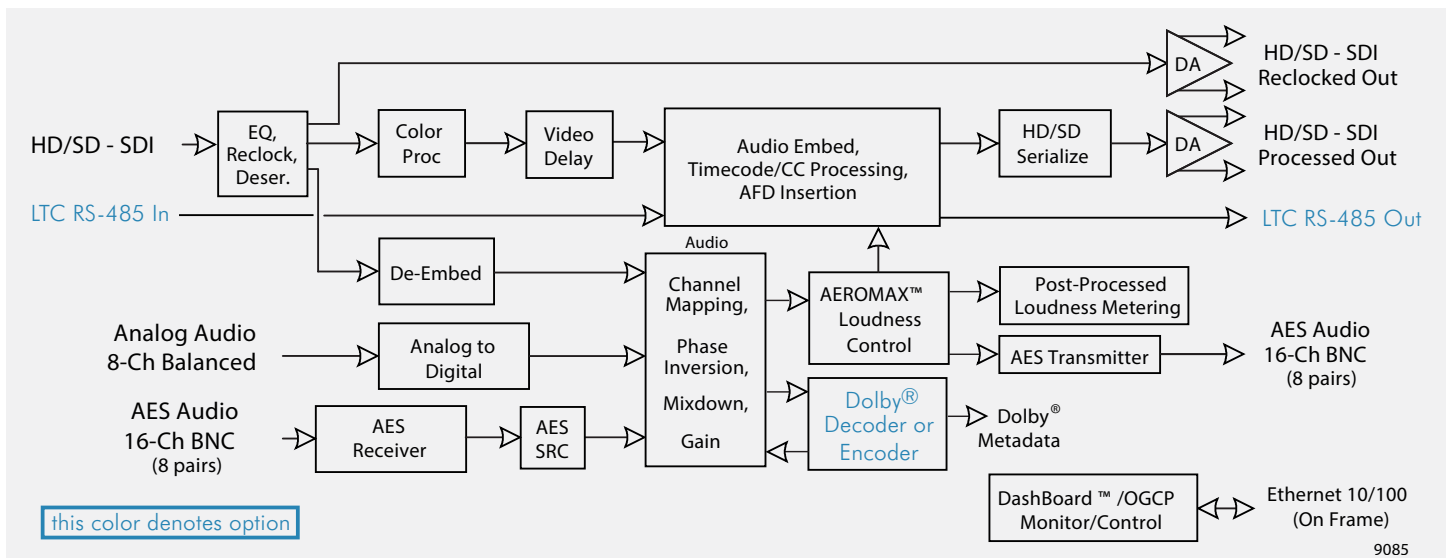
The 9085 features 24-bit audio processing that supports 16 AES input/output channels, 16 de-embedded channels from the SDI input, and eight analog audio inputs. 16 re-embedded channels and 16 AES output channels can be sourced from any of the inputs. Using Linear Acoustic® AEROMAX® technology, the card applies loudness control on up to six channels of audio from any embedded, AES, or analog inputs.



AEROMAX® algorithms use a sophisticated multiband approach to loudness processing. These algorithms can apply multifaceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible. Because the card processes audio loudness locally and in sync with the video, loudness is processed without the accumulated latency delay found in other loudness processors. Full user remote and card-edge processing control allows adjustment of audio parametric control and routing. With multiple selectable presets, several loudness processing profiles offer the best loudness processing solution for various types of program material.

» FEATURES

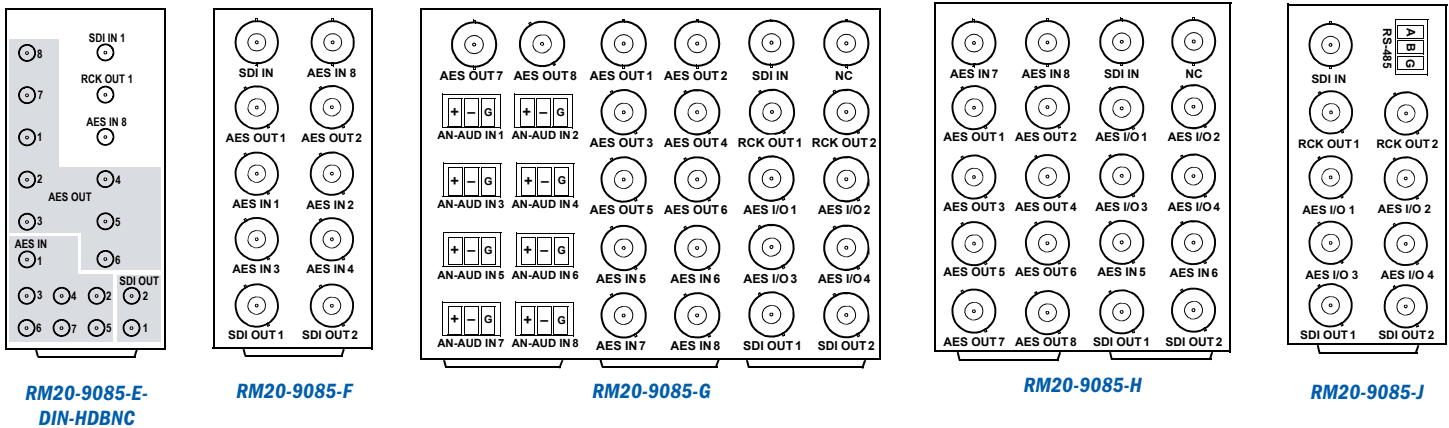
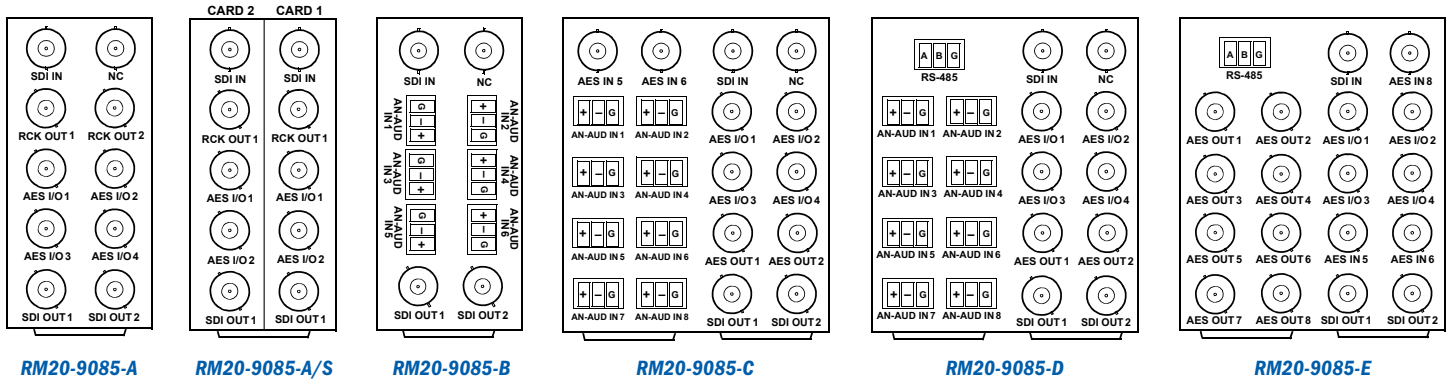
Actively and automatically corrects irritating loudness level differences between programs and commercials	Passes all audio channels	Timecode insertion/conversion. +LTC option allows LTC input/output on shared port, with bidirectional conversion between VBI and LTC on RS-485 or any audio I/O.	24-bit embedded audio processing
Delays video to match audio processing delay; introduces no audio-video delay shift	Sophisticated multiband processing	Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with card 48 kHz timing for glitch-free AES embedding	Audio channel mapping, phase inversion, and level control
Flexible configuration: loudness control can be stereo or 5.1	Set and forget operation with multiple loudness presets		Remote control/monitoring via DashBoard™ software or OGCP-9000 control panel
	8 analog audio inputs with 24-bit conversion		Five-year warranty



» SPECIFICATIONS

Electrical Power: 10 watts	AES Input Number of Inputs: 16-Ch unbalanced BNC (nominal 48 kHz only) Impedance: 75 Ω Input Level: 0.1 V to 2.5 V p-p (5 V p-p tolerant) Resolution: 24-bit	HD/SD-SDI Output Number of Outputs: 2 processed, 2 rerouted Standard: SMPTE 292 and 259M Signal Level: 800 mV nominal Return Loss: >15 dB at 5 MHz - 270 MHz, >12 dB at 270 MHz - 1.485 GHz Jitter: HD: < 0.15 UI, SD: < 0.10 UI Embedded Audio: 16-Ch SD/HD
Loudness Processing Configurations 5.1 Ch, 2.0 Ch (stereo), or 2 x 2.0 Ch (dual stereo)	Analog Audio Input Number of Inputs: 8-Ch balanced Connector: Removable 3-pin Phoenix Signal Level: up to +24 dBu Sample Rate: 48 kHz	
HD/SD-SDI Input Number of Inputs: 1 Standard: SMPTE 292 and 259M Return Loss: >15 dB at 5 MHz - 1.485 GHz		

9085



ORDERING INFORMATION

9085-LP 5.1 HD/SD-SDI Linear Acoustic® AEROMAX® 5.1 Channel Loudness Processor with Embedder/De-Embedder

9085-2LP 2.0 HD/SD-SDI Linear Acoustic® AEROMAX® 2.0 Dual Channel Loudness Processor with Embedder/De-Embedder

9085-LP 2.0 HD/SD-SDI Linear Acoustic® AEROMAX® 2.0 Channel Loudness Processor with Embedder/De-Embedder

RM20-9085-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs, AES BNCs: 4 In/Out, 2 HD/SD-SDI Output BNCs

RM20-9085-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input, 1 HD/SD-SDI Reclocked Output per card, AES BNCs: 2 In/Out per card, 1 HD/SD-SDI Output BNC per card

RM20-9085-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input BNC, 6 Analog Audio Inputs, 2 HD/SD-SDI Output BNCs

RM20-9085-C 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input, AES BNCs: 2 In, 4 In/Out, 2 Out, 8 Analog Audio Inputs, 2 HD/SD-SDI Output BNCs

RM20-9085-D 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI In, AES BNCs: 4 In/Out, 2 Out, 8 Analog Audio In, 2 HD/SD-SDI Out BNCs, RS-485 LTC / Metadata I/O Port

RM20-9085-E 20-Slot Frame Rear I/O Module (Double Width) HD/SD-SDI Input, AES BNCs: 4 In/Out, 2 In, 8 Out, RS-485 LTC / Metadata I/O Port, 2 HD/SD-SDI Output BNCs

RM20-9085-F 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, AES BNCs: 4 In/Out, 2 Out, 2 HD/SD-SDI Output BNCs

RM20-9085-G 20-Slot Frame Rear I/O Module (Triple Width) HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs, 8 AES In BNCs, 8 AES Out BNCs, 8 Analog Audio In BNCs, and 2 HD/SD-SDI Output BNCs

RM20-9085-H 20-Slot Frame Rear I/O Module (Double Width) Digital Video Input, 4 AES In BNCs, 4 AES In/Out BNCs, 8 AES Out BNCs, and 2 SDI Output BNCs

RM20-9085-J 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 AES BNC In/Out, 2 HD/SD-SDI Reclocked Outputs, 2 HD/SD-SDI Processed Outputs, RS-485 LTC / Metadata I/O Port

RM20-9085-E-DIN 20-Slot Frame Rear I/O Module (Standard Width, High Density) HD/SD-SDI Input, 8 AES Inputs, 8 AES Outputs, 2 HD/SD-SDI Outputs, 1 Reclocked HD/SD-SDI Output (All connectors DIN1.0/2.3)

RM20-9085-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width, High Density) HD/SD-SDI Input, 8 AES Inputs, 8 AES Outputs, 2 HD/SD-SDI Outputs, 1 Reclocked HD/SD-SDI Output (All connectors HD-BNC)



LINEAR ACOUSTIC



9086 » EMBEDDED AUDIO LOUDNESS PROCESSOR

OPTIONS

Dolby® Digital AC-3 Encoding (+ENCD), Dolby® E Encoding (+ENCE), Loudness Metering (+LM-C), LTC In/Out (+LTC)



The 9086-SD offers an unmatched ease of use and integration for embedded audio environments requiring loudness processing. Featuring Linear Acoustic® AEROMAX® technology, the 9086-SD offers stereo loudness processing for embedded audio on SD-SDI.

The video protection feature uses the frame reference to ensure stable output in the presence of input errors, to protect MPEG encoders and other downstream equipment.

AEROMAX® algorithms use a sophisticated multiband approach to loudness processing. These algorithms can apply multifaceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible. Because the card processes audio loudness locally and in sync with the video, loudness is processed without the accumulated latency delay found in other loudness processors. A dual 2.0 loudness processing option allows independent loudness processing of two stereo pairs, and is perfectly suited for SD main/SAP programming.

Full user remote and card-edge processing control allows adjustment of audio parametric control and routing. With multiple selectable presets, several loudness processing profiles offer the best loudness processing solution for various types of program material.

» FEATURES

Actively and automatically corrects irritating loudness level differences between programs and commercials

Easily integrated into SDI stream, with collocated or remote metering and control

Delays video to match audio processing delay; introduces no audio-video delay shift

Set and forget operation with multiple pre-defined loudness profile presets

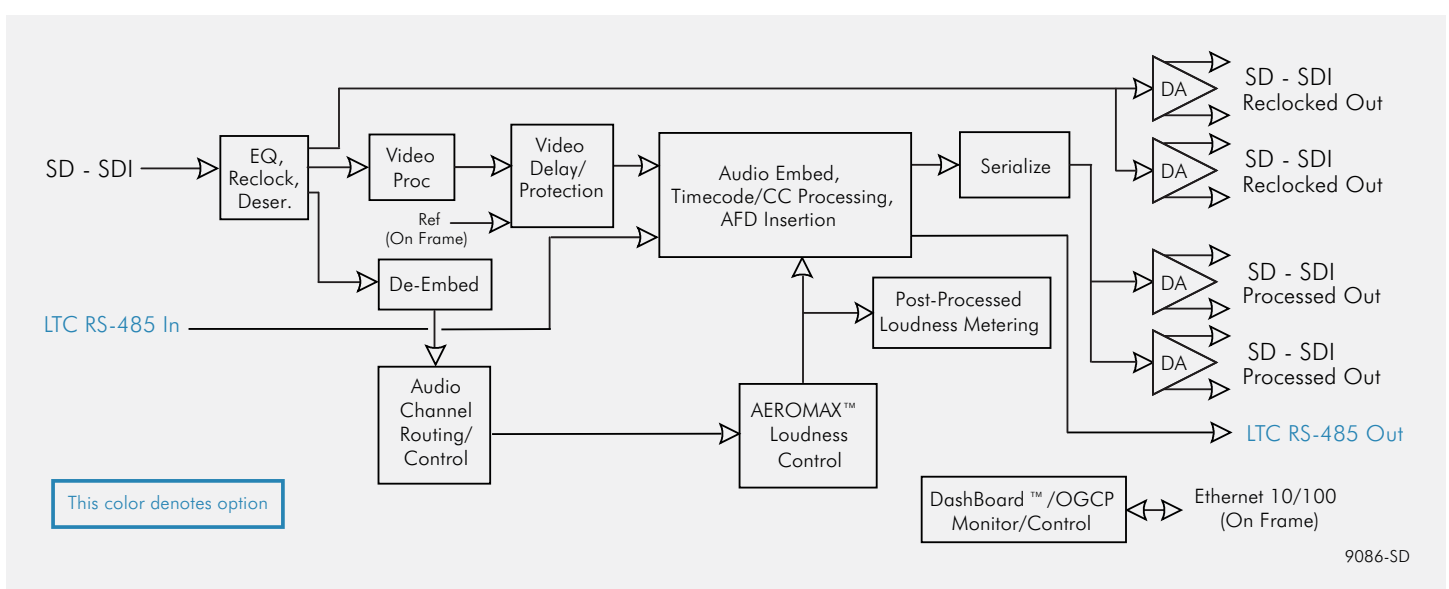
Full 24-bit embedded audio processing

Four-group audio channel mapping, with individual muting, phase inversion and level controls

Timecode insertion/conversion. +LTC option allows LTC input/output on shared port, with bidirectional conversion between VBI and LTC on RS-485 or embedded audio I/O.

Remote control/monitoring via Dashboard™ software or OGCP-9000 control panel

Five-year warranty



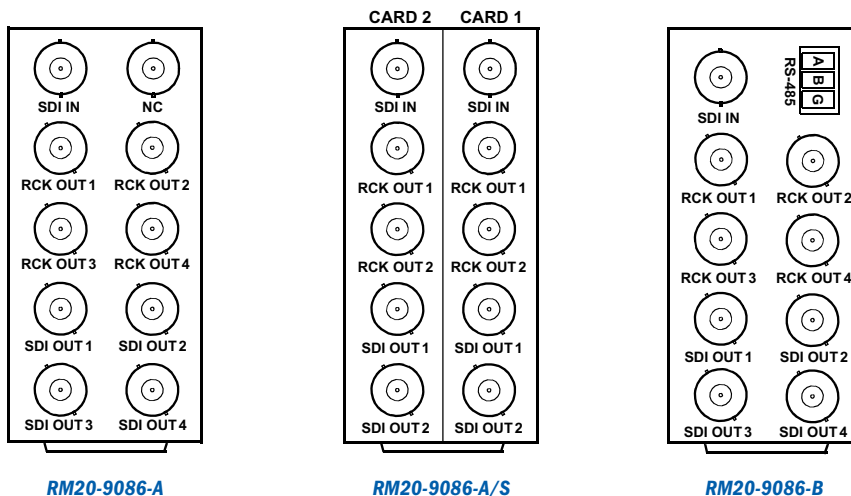
9086-SD



LINEAR ACOUSTIC



9086



» SPECIFICATIONS

Electrical

Power: 10 watts

SDI Input

Number of Inputs: 1
 Standard: SMPTE 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz

SDI Output

Number of Outputs: 4 reclocked
 4 processed
 Standard: SMPTE 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz
 - 270 MHz
 Jitter: < 0.10 UI
 Embedded Audio: 16-Ch

» ORDERING INFORMATION

9086-SD/LP20 SD-SDI Linear Acoustic® AEROMAX®
 2.0 Channel Embedded Audio Loudness Processor

+LP20 Optional, additional Linear Acoustic® AEROMAX®
 2.0 Channel Loudness Processor

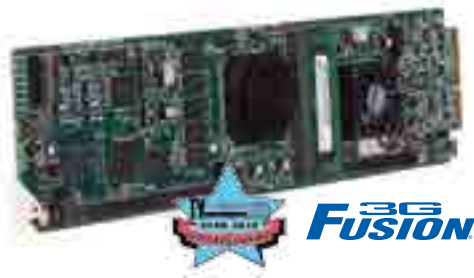
RM20-9086-A 20-Slot Frame Rear I/O Module
 (Standard Width) SDI Input, 4 SDI Reclocked Outputs,
 4 SDI Processed Output BNCs

RM20-9086-A/S 20-Slot Frame Rear I/O Module
 (Split) Dual SDI Input, 2 SDI Reclocked Outputs per
 card, 2 SDI Processed Output per card

RM20-9086-B 20-Slot Frame Rear I/O Module
 (Standard Width) SDI Input, 4 SDI Reclocked Outputs,
 4 SDI Processed Output BNCs, RS-485 LTC Input/
 Output Port

9985 » LOUDNESS PROCESSOR

with Frame Sync



Using Linear Acoustic® AEROMAX® technology, the Fusion3G® 9985 card offers 5.1-channel or stereo loudness processing for any audio channels sourced from embedded, AES, or analog audio inputs. AEROMAX algorithms use a sophisticated multiband approach, in which loudness correction is specifically targeted to various frequency ranges and other characteristics within the program material. The result is audio free from abrupt loudness or image shifts while preserving more of the original ambience than previously possible. Because the card processes audio loudness locally and in sync with the video, loudness is processed without the accumulated latency delay found in other loudness processors. Remote control is quick and easy with the free DashBoard™ remote control software, or Cobalt OGCP-9000 series remote control panels.

Base Models:

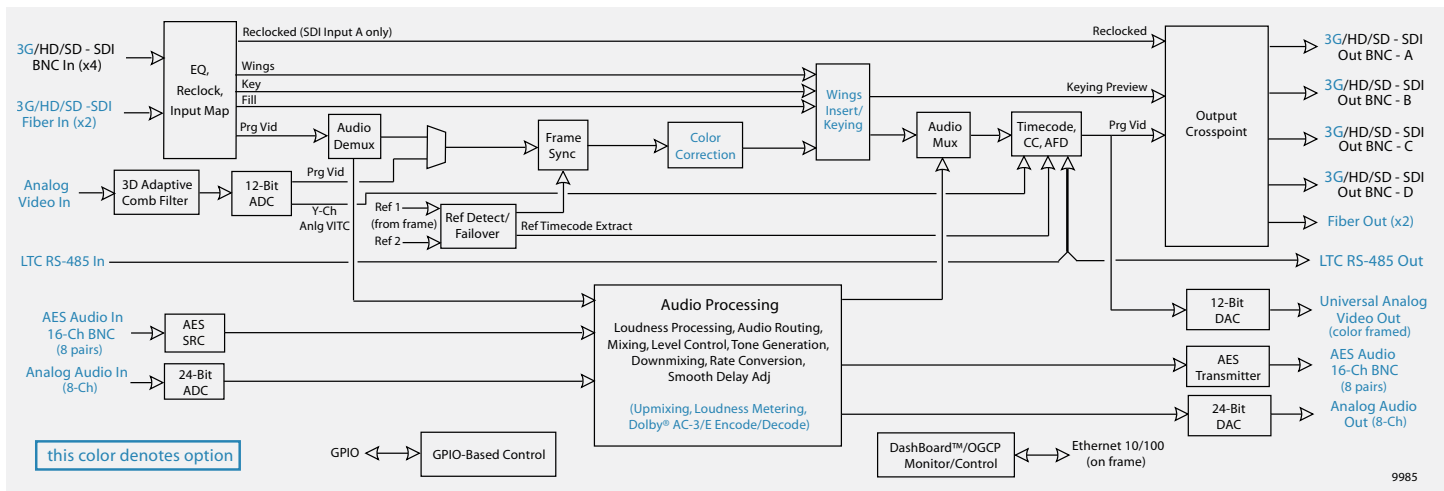
9985-LP5.1

HD/SD 5.1 Channel Loudness Processor with Frame Sync

9985-LP2.0

HD/SD Stereo Loudness Processor with Frame Sync

The 9985's powerful dual DSPs uniquely support optional bundling of multiple loudness and upmixing processing. You can select from options to add (as inputs and/or outputs) fiber, analog video, AES, and analog audio. Other options include wings insertion, general purpose keying, color correction, Dolby® E/AC-3 encoding and decoding (with both decode and re-encode on the same card), ITU/ATSC/EBU compliant loudness metering, and Linear Acoustic® upmixing.



» FEATURES

Loudness processing actively and automatically corrects irritating loudness level differences between programs and commercials

Pre-Post loudness metering provides utmost in confidence and assessment of material (requires OGCP-9000 or WinOGCP remote control panel and option +LM)

Dual DSPs allow multiple audio proc functions – all on the same card

Base loudness processing available in single 5.1-channel, dual stereo, or stereo configurations

Per-channel audio delay with glitchless delay adjustment

Frame sync with reference failover using dual reference inputs on frame

Advanced audio processing allows routing, gain, delay, and flexible mixing

GPIO ports with user-definable functions for system automation and monitoring

Centralized GUI remote control using DashBoard™ software and Cobalt OGCP-9000 remote control panels – custom settings saved as presets can be recalled manually, or with GPI or events-based triggerings

Five-year warranty

» OPTIONAL FEATURES

Dual loudness processors or loudness processor with Linear Acoustic® upMAX™ upmixing on same card

3G SDI (coax) I/O

LTC input/out and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O

Relay bypass available from SDI input to SDI output

Wings insertion/general purpose keying

Fiber 3G/HD/SD inputs/outputs. Fiber ports use blind mating interface & allow card swapping (including optical transceivers) w/ no cable disconnection.

Universal HD/SD analog video I/O. Composite video input sources converted with 3D comb decoder, mitigating common decoding artifacts. Composite video output is color-framed to match reference burst, plus user offset.

AES embedding/de-embedding. AES ports are GUI selectable as input or output. Each input has independent sample rate converter.

Analog audio I/O support

Complete set of Dolby® E / AC-3 encoding and decoding options, including decode + re-encode and multiple AC-3 stream encoding on the same card.



9985 » OPTIONS

» I/O OPTIONS

16 CHANNEL AUDIO EMBEDDING/DE-EMBEDDING (+AES)

Provides eight (total) AES pair BNC connections that can be GUI-configured as inputs or outputs. Independent SRC for all AES inputs, with auto and manual bypass for non-PCM data.

8-PORT AES OUTPUT EXPANSION (+AES16)

Provides the 16-channel embed/de-embed of option +AES (see above) as well as eight added AES output ports to provide a total complement of AES I/O 1 thru AES I/O 8 and added ports AES OUT 1 thru AES OUT 8. Allows 16 channels of AES embedding and 16 channels of AES de-embedding simultaneously. (Option is not available as a field upgrade and also requires Rear I/O Module RM20-9985-G.)

LTC RS-485/AUDIO INPUT/OUTPUT (+LTC)

Provides LTC input/output and bi-directional conversion between VBI and LTC on RS-485 or any audio I/O.

3G/HD/SD-SDI INPUTS/OUTPUTS (+3G)

Extended input/output processing to include 3G, as well as HD/SD-SDI coax support

FIBER INPUTS/OUTPUTS

(+FRX / +FTX / +FRXTX / +FRXRX / +FTXTX)*
Provides one or two fiber connections per card. Inputs can serve any function in the product, outputs can be assigned from any function in the card. Connector type is dual LC with blind-mate connectors. Cards are fully swappable.

UNIVERSAL ANALOG VIDEO INPUTS/OUTPUTS (+ANV)*

Provides an analog video input and output (CVBS, component, RGB (sync on green))

ANALOG AUDIO INPUTS/OUTPUTS (+ANA)*

Provides up to eight channels (total) of balanced analog audio inputs and outputs

*Requires expansion Rear Module (for example, 9985+ANV requires RM20-9985-XB expansion Rear Module)

» VIDEO OPTIONS

WINGS INSERTION (+WINGS)

Provides wings insertion using an independent SDI input provided for wings signal. Provides programmable insertion width.

KEYING (+KEYER)

Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output.

Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

COLOR CORRECTION (+COLOR)

Provides independent RGB channel controls for luma, black, and gamma. Ultra-fast response time. The color correction feature is perfectly suited for use with Cobalt OGCP-9000/CC Remote Control Panel.

UPGRADE TO 3G (+3G)

Upgrades base 9985 model to 3G/HD/SD

FRAME BUFFER EXPANSION (+MEM)

Increases the independently adjustable audio and video delay buffer capacity to 47 seconds for SD video, 8 seconds for HD video, or 4 seconds for 3G video. (+MEM is a hardware-based option and is not available as a field upgrade. This option is displayed as "+2GB" on the DashBoard card info pane.)

» AUDIO OPTIONS

LINEAR ACOUSTIC® LOUDNESS PROCESSING (+LP51/+LP20)*

Featuring Linear Acoustic® AEROMAX® technology and available in 5.1-channel (LP51) and stereo (LP20) configurations. These loudness processors use inputs from any source received by the card, or any mixing setting produced by the card. AEROMAX® algorithms use a sophisticated multi-band approach to loudness processing, and can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original content than previously possible.

Up to two 5.1 loudness processors can be ordered per card, order as +LP51A and +LP51B. Up to four stereo loudness processors can be ordered per card, order as +LP20A, +LP20B, +LP20C and +LP20D.

LINEAR ACOUSTIC® AUTOMATIC UPMIXER (+UM)*

Featuring Linear Acoustic® UPMAX™ technology, upmixing allows legacy stereo program content to be converted to full 5.1-channel audio. UPMAX™ mode detects 2.0 content and automatically applies upmix mode (with configurable switchover fade-in/fade-out) depending on absence or presence of 5.1 source audio.

Up to two upmixers may be configured on the card, order as +UMA and +UMB.

SOFTWARE LOUDNESS METER (+LM-C)

Cobalt's +LM audio loudness metering option (in conjunction with a Cobalt OGCP-9000 Remote Control Panel with +LM-P option) provides a flexible solution for ingest or on-air loudness metering and assessment in compliance with ITU/ATSC/EBU standards. Easy to use, the +LM offers "true peak" level detection, error tracking and logging, and intuitive interface with touch screen control.

AUDIO FAILOVER (+AFO)

Provides automatic failover to alternate ("secondary") channels to substitute for the primary channels in the event of audio signal loss.

AUTO DOWNMIX (+ADM)

Provides automatic Stereo downmix from selected alternate multi-channel sources if primary Stereo channels lose signal.

DOLBY® DIGITAL/DIGITAL PLUS™ ENCODING (+ENCD)

Provides Dolby® Digital/Digital Plus™ encoding from any combination of audio sources supported by the card. Up to four independent encoders - all on the same card - can be included (+ENCDA thru +ENCDD). This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

DOLBY® E/DIGITAL/DIGITAL PLUS™ DECODING (+DEC)

Decodes Dolby® E, Digital, and Digital Plus™ signals from AES or embedded sources. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

DOLBY® E ENCODING (+ENCE)

Provides Dolby® E encoding from any combination of audio sources supported by the card. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

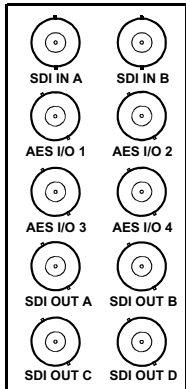
DOLBY® DESCRIPTIVE VIDEO SERVICES® ENCODING (+ENCVDS)

Provides DVS encoding of secondary narrative audio on cards equipped with Dolby® Digital/Digital Plus™ encoding. This option is available on the same card along with any other Dolby options listed here. See Fusion3G® Dolby Options (page 8) for more information.

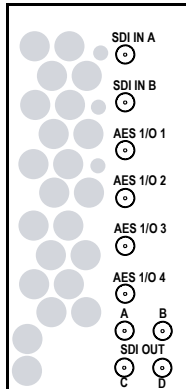
*The following Processing/Upmixing combinations, and their subsets, are available. Contact sales for more information.

- Upmixer, 5.1 Processor, Aux Stereo Processor (+UMA, +LP51A, +LP20A)
- Two stereo processors, Two upmixers (+LP20A, +LP20B, +UMA, +UMB)
- Two 5.1 loudness processors (+LP51A, +LP51B)
- Four stereo loudness processors (+LP20A, +LP20B, +LP20C, +LP20D)

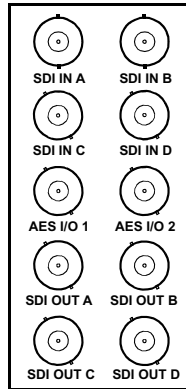
9985



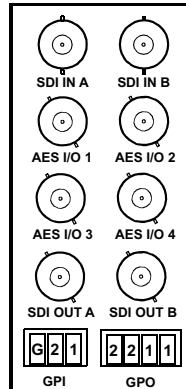
RM20-9985-B



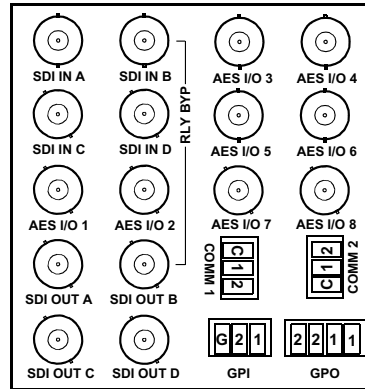
RM20-9985-B-HV



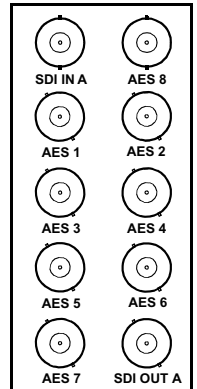
RM20-9985-C



RM20-9985-D

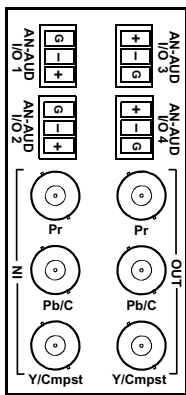


RM20-9985-E

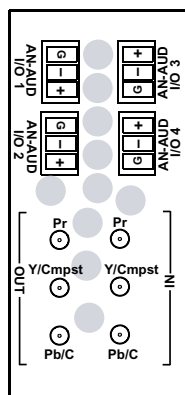


RM20-9985-F

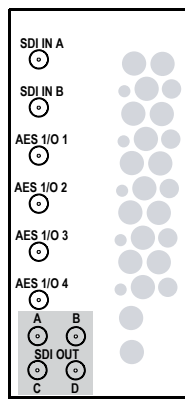
EXPANSION REAR I/O MODULES



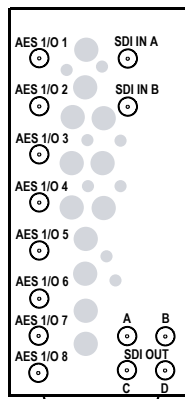
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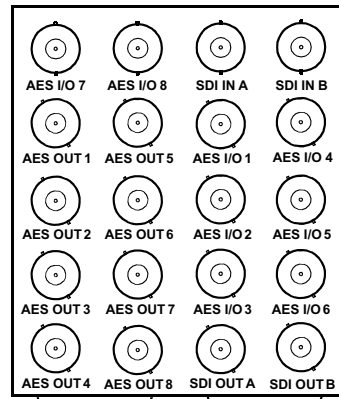
RM20-9985-XB-HV



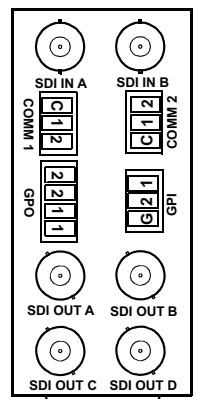
RM20-9985-F-HV2



RM20-9985-F-HV

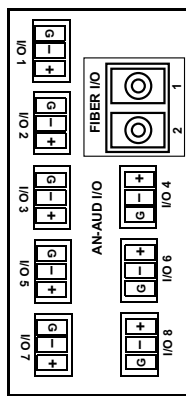


RM20-9985-G

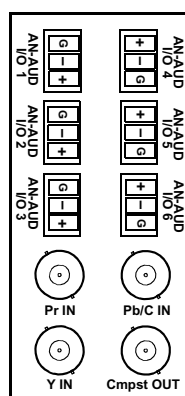


RM20-9985-H

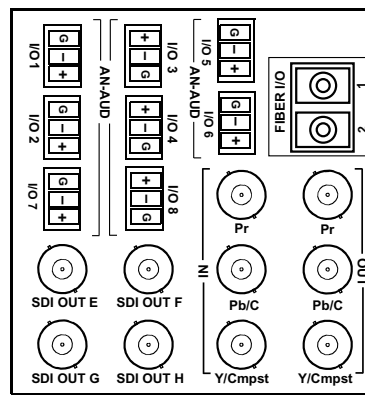
Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an "X" in the part number and must be used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 3)



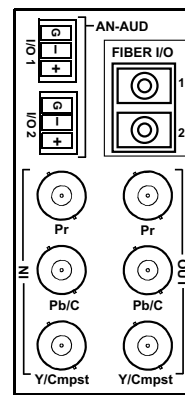
RM20-9985-XC



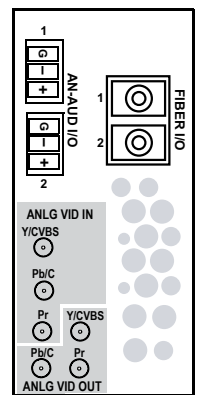
RM20-9985-XD



RM20-9985-XE



RM20-9985-XF



RM20-9985-XF-HV

9985

)) ORDERING INFORMATION

9985-LP51 Linear Acoustic® AEROMAX® 5.1 Channel Loudness Processor with Frame Sync

9985-LP20 Linear Acoustic® AEROMAX® 2.0 Channel Loudness Processor with Frame Sync

BASE REAR I/O MODULES

Base Rear I/O Modules provide connections for standard card BNC video and audio connections, as well as other connections depending on rear module part number. These modules mate directly with the Fusion3G® card.

RM20-9985-B 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Input, 4 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9985-B-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9985-B-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 4 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9985-C 20-Slot Frame Rear I/O Module (Standard Width) 4 3G/HD/SD-SDI Inputs, 2 AES I/O BNCs, 4 3G/HD/SD-SDI Outputs

RM20-9985-D 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI Inputs, 4 AES I/O BNCs, 2 GPIO, 2 3G/HD/SD-SDI Outputs

RM20-9985-E 20-Slot Frame Rear I/O Module (Double Width) 4 3G/HD/SD-SDI Inputs (1 with Relay Bypass), 8 AES I/O BNCs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI Outputs

RM20-9985-F 20-Slot Frame Rear I/O Module (Standard Width) 1 3G/HD/SD-SDI Input, 8 AES I/O BNCs, 1 3G/HD/SD-SDI Output

RM20-9985-F-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors DIN 1.0/2.3)

RM20-9985-F-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 2 3G/HD/SD-SDI Inputs, 8 AES Inputs/Outputs, 4 3G/HD/SD-SDI Outputs (all connectors HDBNC)

RM20-9985-F-HV2-DIN 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors DIN 1.0.2.3)

RM20-9985-F-HV2-HDBNC 20-Slot Frame Rear I/O Module (Standard Width; High Ventilation) 3G/HD/SD-SDI Inputs, (4) AES Inputs/Outputs, (4) 3G/HD/SD-SDI outputs (all connectors HD-BNC)

RM20-9985-G 20-Slot Frame Rear I/O Module (Double Width) 2 3G/HD/SD-SDI Inputs, 8 AES I/O BNCs, 8 additional AES Outputs, 2 3G/HD/SD-SDI Outputs (Available only in conjunction with card option +AES16)

RM20-9985-H 20-Slot Frame Rear I/O Module (Standard Width) 2 3G/HD/SD-SDI BNC Inputs, 2 GPIO, 2 COMM, 4 3G/HD/SD-SDI BNC Outputs

UPGRADE TO 3G (+3G) Upgrades base 9985 model to 3G/HD/SD

EXPANSION REAR I/O MODULES

Expansion Rear I/O Modules are required for some video and audio options and fiber connections. These rear modules mate with an Expansion piggyback card that is mounted to the base Fusion3G® card when equipped with these options. Expansion Rear I/O Modules are identified with an “-X” in the part number and must be used with a Base Rear I/O Module. See 20-Slot Frame Card Capacity and Rear Modules (pg. 3)

RM20-9985-XB 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9985-XB-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9985-XB-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) Component In, 4 Analog Audio I/O, Component Out

RM20-9985-XC 20-Slot Frame Rear I/O Module (Standard Width) 2 Fiber I/O, 8 Analog Audio I/O

RM20-9985-XD 20-Slot Frame Rear I/O Module (Standard Width) Component In, 6 Analog Audio I/O, Composite Out

RM20-9985-XE 20-Slot Frame Rear I/O Module (Double Width) Component In, 2 Fiber I/O, 8 Analog Audio I/O, Component Out, 4 3G/HD/SD-SDI Outputs

RM20-9985-XF 20-Slot Frame Rear I/O Module (Standard Width) Component In, 2 Fiber I/O, 2 Analog Audio I/O, Component Out

RM20-9985-XF-HV-DIN 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are DIN1.0/2.3) This Rear I/O Module must be used with an HV Base Rear I/O Module.

RM20-9985-XF-HV-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) CVBS/Component In, 2 Fiber I/O, 2 Analog Audio I/O, CVBS/Component Out. (All coaxial connectors are HD-BNC) This Rear I/O Module must be used with an HV Base Rear I/O Module.

9223 » DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER



The 9223 provides a card-based solution for distribution of MPEG-4 encoding. Utilizing the openGear® open-architecture platform, the 9223 offers scalable incorporation and the easy-to-use DashBoard™ setup and control operator interface. Up to 10 of the 9223 cards can be installed in a 20-slot frame, offering distribution delivery of up to 20 individual or simulcast channels in a single frame, using less than 150W total, for reduced operating expenses.

The 9223 offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. In addition to two ASI outputs, the 9223 provides two simultaneous transport Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices.

When using the Ethernet output, the 9223 supports the traditional UDP/RTP/SPMTE 2022 FEC protocols, as well as the HTTP Live Streaming protocol for transmitting live video over the Internet. Using HTTP Live Streaming, the 9223 can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported), tablets, and a variety of consumer set-top boxes (such as the Amino A140 and the Roku Player).

RTMP support allows direct publishing of real-time, live content to Adobe® Media Servers or any other servers, web sites and CDNs with RTMP ingress, such as Justin.tv, UStream, LiveStream and Akamai. Publish professional-quality real-time SD/HD content to Internet viewers (including some critical features not available in PC-based software encoders) such as ancillary data support (closed-captioning, AFD) and SD-SDI/HD-SDI video inputs with embedded audio support – all in broadcast-grade video quality.

Full user remote monitor/control allows full card status and control access across a standard Ethernet network. Status monitoring is also available at card edge.

» FEATURES

DVB-ASI and Ethernet outputs

Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling

Full support of CEA-608 and CEA-708 closed captioning and PMT information

License-based options allow packages limited to only options needed for each unit and its processed channels
RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers.

HTTP Live Streaming protocol allows viewing by Apple® and Android™ 3.0 (or higher) devices.

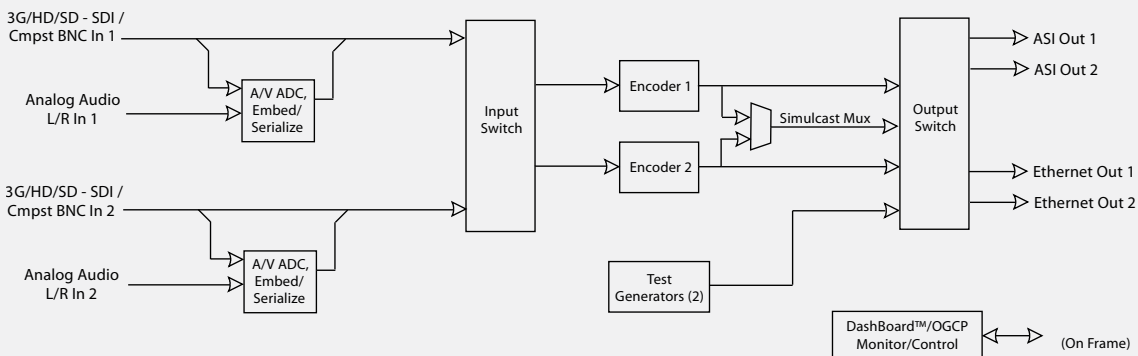
Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources

Built-in Packet Test Generators allow pre-validation of transport

Optional support for additional audio pairs per encoded output

Multiple pre-defined control templates provide automatic setup of popular contribution-to-distribution schemes
Ethernet remote control/monitoring via free DashBoard™ software

Five-year warranty



9223



9223

SPECIFICATIONS

Electrical

Power: 8 W

3G/HD/SD-SDI Inputs

Number of inputs: 2, each configurable as:
 3G-SDI (SMPTE 424M)
 HD-SDI (SMPTE 292M)
 SD-SDI (SMPTE 259M) with EDH
 Composite analog video (PAL/NTSC)

Audio Inputs Supported

Embedded SDI, AC-3 (optional),
 Unbalanced stereo audio via RCA jacks

Video Encoding

Dual-channel HD Video:
 MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
 MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
 CBR & VBR
 2Mbps to 30Mbps (configurable)
 Dual channel SD Video:
 MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
 CBR & VBR
 1.5Mbps to 10 Mbps (configurable)

Audio Encoding

MPEG-1 layer II, up to 2 stereo pairs
 Dolby® Digital AC 3 (optional)
 MPEG-4 AAC-LC up to 2 pairs
 MPEG-2(ADTS) & MPEG-4(LATM/LAOS encapsulation)
 Lip sync adjustment

Video Resolution Supported

HD: 1080 x 1920p 60/50
 1080 x 1920/1440i 25/29.97/30
 720 x 1280/960/640p 50/59.94
 SD: 576 x 720/528i 29.97fps
 576 x 720/528i 25fps

Video Pre-Processing

Advanced adaptive spatial filtering
 Closed Captions CEA 608B & CEA-708C
 WSS/AFD
 Teletext (WST system B)

ASI Outputs

Number of outputs: 2, 75Ω BNC DVB-ASI
 213Mbit/s maximum ASI TS
 bit-rate per port

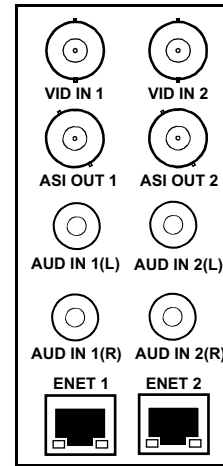
Ethernet

Number of control/monitor connections:
 2, redundant 10/100Base-T RJ-45
 Number of transport outputs:
 2, 100/1000Base-T RJ-45
 ports, auto-negotiate or fixed speed
 IPv4, IPv6, UDP & RTP
 SMPTE 2022 ProMPEG FEC CoP3
 'Forward Error Correction'
 (Row and Column)

Options

Note: Some options listed here are upgrades for the single-channel version of this product. Refer to Ordering Information for further details.

Upgrade License; SD Channel to HD up to 1080i (**+SD-HD-I**)
 Upgrade License; SD Channel to HD up to 1080p (**+SD-HD-P**)
 Upgrade License; HD 1080i Channel to HD 1080p (**+HD-I-HD-P**)
 AAC Audio License; one AAC-LC Stereo Channel (**+UP-AAC**)
 Additional Audio Pair License; allows an additional audio pair (from an SDI embedded pair) to be encoded along with base single-pair embedding. See Ordering Information for more details (**+2A**)
 SMPTE 2022 FEC Insertion License. Provides one FEC insertion per device Ethernet port (one +SMPTE2022FEC license max. per device) (**+SMPTE2022**)
 Add Encoder Second Channel H.264 SD (applicable for single-channel card 9223-S) (**+SD**)
 Add Encoder Second Channel H.264 SD/HD (up to 1080i) (applicable for single-channel card 9223-S (**+HD-I**))
 Add Encoder Second Channel H.264 SD/HD (up to 1080p) (applicable for single-channel card 9223-S (**+HD-P**))



RM20-9223-B

ORDERING INFORMATION

9223-D Dual-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD

9223-D-HD-I Dual-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080i

9223-D-HD-P Dual-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080p

RM20-9223-B 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI/SD BNC Composite In, (2) DVB-ASI BNC Out, (4) Unbalanced Analog Audio RCA In, (2) 100/1000Base-T RJ-45 Ethernet

+SD-HD-I Upgrade License; SD Channel to HD up to 1080i

+SD-HD-P Upgrade License; SD Channel to HD up to 1080p

+HD-I-HD-P Upgrade License; HD 1080i Channel to HD 1080p

+UP-AAC AAC Audio License

+2A Additional Audio Pair License

+SMPTE2022 SMPTE 2022 FEC License

Single-Channel Alternate Models and Add Channel Upgrade Licenses

9223-S Single-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD

9223-S-HD-I Single-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080i

9223-S-HD-P Single-Channel 3G/HD/SD MPEG-4 Encoder with H.264 SD/HD up to 1080p

+SD Add Encoder Second Channel H.264 SD (applicable for single-channel card 9223-S)

+HD-I Add Encoder Second Channel H.264 SD/HD (up to 1080i) (applicable for single-channel card 9223-S)

+HD-P Add Encoder Second Channel H.264 SD/HD (up to 1080p) (applicable for single-channel card 9223-S)

Note: The Upgrade, Audio, and SMPTE2022 licenses above are also available for single-channel alternate models.

Single-Channel Encoders 9223-S (9223-SA-S)		
Base	One +2A License	Two +2A Licenses
1 Stereo PID	2 Stereo PIDs	3 Stereo PIDs
Dual-Channel Encoders 9223-D (9223-SA-D)		
Base	One +2A License	Two +2A Licenses
2 Stereo PIDs	3 Stereo PIDs (Added PIDs per licensing can be applied to Encoder 1 or Encoder 2 channels)	4 Stereo PIDs (Added PIDs per licensing can be applied to Encoder 1 or Encoder 2 channels as desired, also including configuring the device as single-channel with 4 total Stereo PIDs in one encoder channel)
Note: • Maximum of two (2) +2A licenses can be added to single-channel (-S) or dual-channel encoder (-D). • For Dual-Channel Encoders, added +2A audio channels can only be sourced from de-embedded SDI.		

9990-DEC-MPEG » MPEG4 AVC & MPEG2 DECODER WITH ASI & IP INPUTS & SDI OUTPUTS

with support up to 3G 1080p 60



The all-new Cobalt® 9990-DEC-MPEG MPEG4 AVC and MPEG2 Decoder with ASI and IP Inputs and SDI Outputs with support up to 3G 1080p 60 provides a high performance real-time MPEG-2 and MPEG-4 SD and HD video decoding openGear® solution. Its design is practically future proof and decodes traditional video formats such as UDP and RTP (MPEG Transport Stream) as well as Internet and Mobile formats such as RTMP (Adobe® Flash) and HLS (Apple® HTTP Live Streaming).

The 9990-DEC-MPEG supports newer cameras that output RTMP and security cameras that output RTSP. Its high-density, low power design saves on operating expenses, with up to 10 cards installed in a 20-slot openGear® frame.

IP and DVB-ASI input streams are supported, with outputs as ASI, DVB-ASI, SDI, HDMI, and CVBS (for SD streams) using MPEG4 AVC or MPEG2 decoding. The 9990-DEC-MPEG can decode from several audio codecs and provides Dolby® pass-thru. Full user DashBoard™ remote control allows full status and control access locally or across a

standard Ethernet network. A complete SNMP MIB is also included.

FEATURES

Comprehensive MPEG decoding solution – MPEG4 AVC and MPEG2 to ASI, SDI, HDMI and CVBS with built-in audio codecs. Convenience IP output also.

Supports RTMP and RTSP sources

MPEG-1 Layer II, AAC-LC, AAC-HE, E-AC-3 and AC-3 audio decoding standard. Dolby pass-thru (Dolby decode option available).

DVB-ASI Turnaround to IP and ASI with SPTS Splitting

IP reception of unicast or multicast

Several options available for scalable configuring

SNMP MIB included

Low-power/high-density design – less than 14 Watts per card

Remote control/monitoring via Dashboard™ software

Five year warranty

OPTIONS

Dolby® Decode License (+DEC-DDEC). Allows Dolby audio to be decoded as SDI embedded PCM audio or analog audio output

SMPTE 2022 Forward Error Correction License (+FEC)

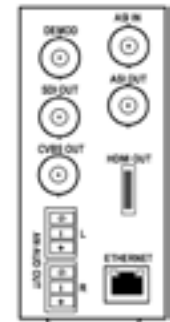
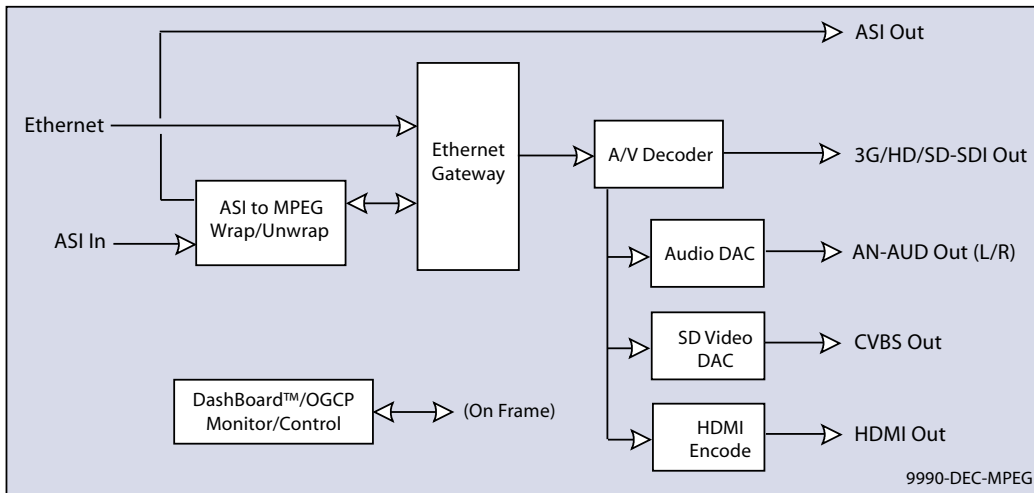
IP License (+IP)

Automatic Repeat Request License (+ARQ)

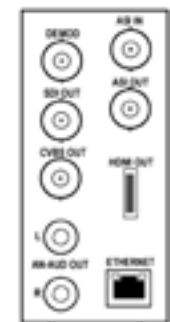
Monitoring License (+TSMON)

Genlock License (+GENLOCK)

Stream Splitting License Option (+SPTS)



RM20-9990DEC MPEG-B



RM20-9990DEC MPEG-C



9990-DEC-MPEG

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 14 Watts

Inputs

(1) DVB-ASI 75Ω BNC
 (1) IP; 1000Base-T RJ-45
 Gen lock (from frame ref 1/2)

Outputs

(1) 3G/HD/SD-SDI 75Ω BNC
 (1) CVBS 75Ω BNC
 (1) DVB-ASI 75Ω BNC
 (1) HDMI
 (2) Analog Audio Out L/R (balanced 3-pin terminals or unbal RCA depending on rear module used)

Network Transport Protocols

UPD (Unicast or Multicast)
 RTP (Unicast or Multicast)
 RTMP (Adobe Flash)
 RTSP (Security Camera)
 SMPTE 2022 Pro-MPEG-FEC
 ARQ

Video Resolution

HD:
 1080 x 1920p - 60/50
 1080 x 1920/1440i - 25/29.97/30
 720 x 1280p/960 - 50/59.94
 960 x 540 - 25/29.97
 SD:
 480 x 720/704/640/528 - 29.97
 360 x 640p - 29.97
 576 x 720/704/640/528 - 25
 Lower Resolutions:
 480x270, 320x240, 320x180

Audio Codec Supported/Processing

MPEG-1 Layer 2 (mp2)
 AAC-LC
 HE-AAC
 AC-3
 E-AC-3
 Dolby® pass-thru

ORDERING INFORMATION

9990-DEC-MPEG MPEG4 AVC and MPEG2 Decoder with ASI and IP Inputs and SDI Outputs with support up to 3G 1080p 60

RM20-9990DEC-B 20-Slot Frame Rear I/O Module (Standard Width) (1) RJ-45 Ethernet connector, (1) ASI Input BNC, (1) ASI Output BNC, (1) 3G/HD/SD-SDI Output BNC, (1) DEMOD Output BNC, (1) CVBS Output BNC, (1) HDMI Output (2) Balanced Analog Audio Outputs

RM20-9990DEC-C 20-Slot Frame Rear I/O Module (Standard Width) (1) RJ-45 Ethernet connector, (1) ASI Input BNC, (1) ASI Output BNC, (1) 3G/HD/SD-SDI Output BNC, (1) DEMOD Output BNC, (1) CVBS Output BNC, (1) HDMI Output (2) Unbalanced Analog Audio Outputs (RCA)

+ARQ ARQ License Option

+DEC-DDEC Dolby® Decode License Option

+FEC SMPTE 2022 Forward Error Correction License Option

+GENLOCK Genlock License Option

+IP IP License Option

+SPTS SPTS Stream Splitting License Option

+TSMON Monitoring License Option



9990-TRX-MPEG » MULTI-STANDARD BROADCAST TRANSCODER

OPTIONS

+XC2HD - Adds two transcoding licenses



The 9990-TRX-MPEG is a full-featured quad-channel video transcoder using the latest advances in video compression technology to ensure excellent video quality at low bit rates.

The 9990-TRX-MPEG is a full-featured quad-channel video transcoder that delivers up to 40 individual HD/SD channels. The latest advances in video compression technology ensure excellent video quality at low bit rates. Simultaneous support of DVB-ASI, broadcast over IP, MPEG-DASH Streaming, and HTTP Live Streaming allows content to be freely distributed over virtually any video network.

The 9990-TRX-MPEG provides transcoding of two video services (channels) using either MPEG-2 or MPEG-4 AVC codecs in SD format and the output of MPEG-1 Layer II services. The single program can be outputted over ASI and IP interfaces individually or simultaneously. License options allow easy scalability via easy to install software uploads without removing or powering-down the card.

The openGear® card form factor and DashBoard™ remote control makes for easy integration into existing terminal equipment environments.

» FEATURES

Dual-channel multi-standard HD/SD transcoding standard - scalable for additional transcoding using software licenses as simple downloads

Supports MPEG-1 Layer II, AAC, and Dolby® AC-3 audio inputs

Full, future-proof "any-to-any" multi-standard codec support - adapts services from both MPEG-2 and MPEG-4 AVC systems

Low-power, high-density design; <14 Watts - up to 10 cards per frame

IP transmission using unicast or multicast

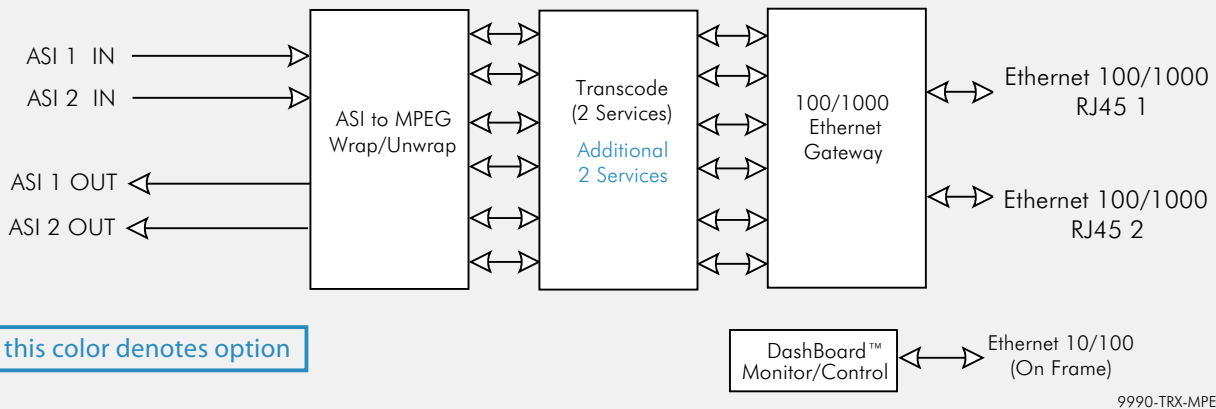
Gigabit Ethernet and DVB-ASI input/outputs

Audio pass-through

VBI and closed-captioning pass-through

Easy integration and control/monitoring via DashBoard remote control

Five year warranty





9990-TRX-MPEG

SPECIFICATIONS

Power

14 Watts

Inputs/Outputs

2x 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed

2x DVB-ASI input ports, BNC 75Ω

2x DVB-ASI output ports, BNC 75 Ω

213Mbit/s maximum ASI TS bit-rate per port

Ethernet

Number of Ports: 4

Cable Type: Standard straight-thru CAT-5e

Connector Type: RJ-45

Network Transport Protocols

UDP/IP (Unicast and Multicast)

RTP/IP (Unicast and Multicast)

RTMP (Flash)

HTTP Live Streaming (HLS): populates an external web server through FTP or SFTP

Direct HTTP Streaming: encodes directly to an HTTP connection. Automatically generates web pages with a video window for all supported modes (VLC plug in required)

Transcode Modes

Multi-codec capable

MPEG-2 to MPEG-4 AVC

MPEG-4 AVC to MPEG-2

SD/HD MPEG-2 to MPEG-2 and AVC to AVC re-encode

- format conversion

rate reduction

Video Processing

Integrated downconversion

- HD to SD

- Sub-SD resolutions

Adaptive deinterlacer

Frame rate reduction

AFD handling

Closed captions and VBI passthrough

Video Transcoding

Input:

MPEG-4 AVC HP@L4.0, HP@L4.2 (HD)

MPEG-4 AVC MP@L3.0 (SD)

MPEG-2 HP@HL (HD)

MPEG-2 MP@ML (SD)

Output:

MPEG-4 AVC HP@L4.0, HP@L4.2 (HD)

MPEG-4 AVC MP@L3.0 (SD)

MPEG-2 HP@HL (HD)

MPEG-2 MP@ML (SD)

CBR & VBR

1.5Mbps to 10 Mbps (profile dependent)

Video Formats

Input:

1080 x 1920p 60/50

1080 x 1920/1440i 25 29.97/30

720 x 1280/960 50/59.94

960 x 540 25/29.97

480 x 720/704/640/528 29.97

576 x 720/704/640/528 25

640x480, 480x270, 320x240, 320x180

Output:

1080 x 1920p 60/50

1080 x 1920/1440i 25 29.97/30

720 x 1280/960 50/59.94

960 x 540 25/29.97

480 x 720/704/640/528 29.97

576 x 720/704/640/528 25

640x480, 480x270, 320x240, 320x180

29.97, 25, 15, 12.5, 7.5, 6.25 frames/sec

Audio Transcoding

Input:

MPEG-1 layer II stereo

MPEG-4 AAC-LC stereo and 5.1

MPEG-4 HE-AAC 5.1

Dolby AC-3 stereo, 5.1, 7.1

Output:

MPEG-1 layer II

MPEG-4 AAC-LC

Pass-through

Conversion:

5.1 -> 5.1, 2.0

Management

10/100/1000Base-T Ethernet (RJ-45)

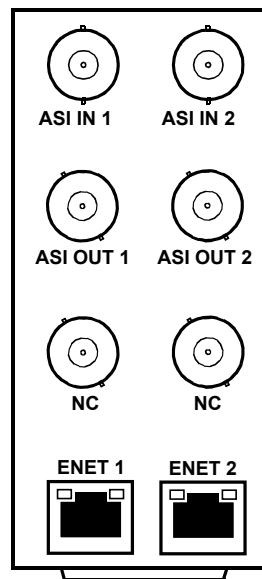
Configuration import/export

Visual fault indicator

SNMP v1,v2

Datasafe™ automated card configuration

Accurate bit rate control



RM20-9990-B

ORDERING INFORMATION

9990-TRX-MPEG Multi-Standard Broadcast Transcoder

+TRX2 Add Transcoding License. Adds transcoding for two additional services

RM20-9990TRX-B 20-Slot Frame Rear I/O Module (Standard Width) 2 ASI Input BNCs, 2 ASI Output BNCs, 2 Gigabit Transport Ethernet ports

9220 » BIDIRECTIONAL ASI/MPTS GATEWAY



The 9220 card bidirectional ASI/IP gateway can receive transport streams over ASI and transmit streams over IP, or receive transport streams over IP and transmit streams over ASI. It features up to six ASI ports, individually configurable as inputs or outputs. With option +TS, the 9220 can support up to six ASI/IP bidirectional conversions simultaneously (standard support with no additional licenses supports one ASI/IP bidirectional gateway). The 9220 can be used to facilitate seamless plant distribution/contribution over IP. It also includes advanced redundancy protection features, allowing for automatic failover if the primary signal disappears. The card supports both unicast and multicast, with IGMP V1, V2 and V3. DashBoard™ remote control allows easy centralized control and monitoring access.

» FEATURES

Up to six ASI inputs/outputs supported (standard supports one ASI/IP gateway with up to five additional with corresponding +TS licensing)

Bidirectional ASI/IP encapsulation or de-encapsulation

1x Gigabit Ethernet IP interface
Optional 2x Gigabit IP interface

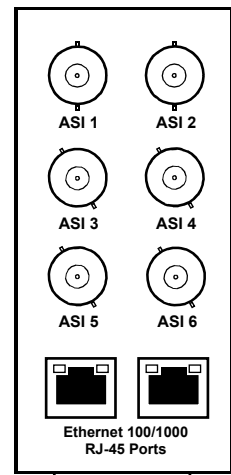
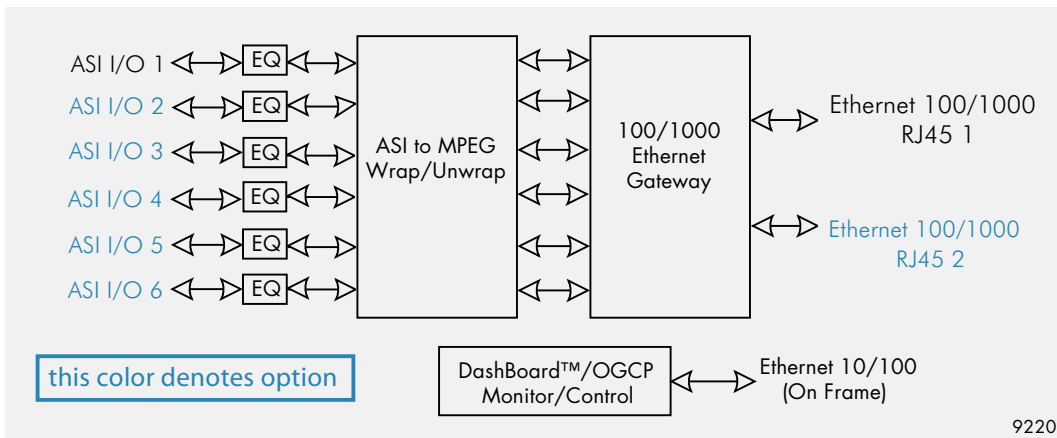
Multicast IGMP v1, v2, and v3 support
Hot-swappable

High density with 60 channels per 2RU frame

Energy-efficient 12 watt power consumption

Remote control/monitoring via DashBoard™ software

Five-year warranty



RM20-9220-B

» SPECIFICATIONS

Options

- Optional Additional ASI or IP Transport Stream Output (+TS)
- Optional Activated Second Gigabit Ethernet Port (+GBE)

» ORDERING INFORMATION

9220 Bidirectional ASI/MPTS Gateway

RM20-9220-B 20-Slot Frame Rear I/O Module (Standard Width) 6 ASI Input/Output BNCs (software configurable), 2 Gigabit Ethernet Ports



9970-QS » 3G/HD/SD-SDI/CVBS QUINT-SPLIT MULTI-IMAGE DISPLAY PROCESSOR

with Configurable PiP Layouts and Character Burn



The all-new Cobalt® 9970-QS 3G/HD/SD-SDI/CVBS Quint-Split Multi-Image Display Processor integrates five discrete 3G/HD/SD-SDI or CVBS inputs onto a single 3G/HD/SD-SDI quint-split output, with each input image being flexibly inserted into the output image area.

Fully-flexible layouts using one-button templates or custom layouts using easy to use sizing/positioning custom controls. Custom layouts can be saved to user presets. A master output up-down-cross convert scaler provides scale-to HD or 3G SDI formats for the combined multiviewer output. Advanced graphics such as user identify text, PiP input video format, audio meter bars, tally/UMD, reticules, and timecode can be burned into any PiP with full user attributes control. User-configurable Quality Check allows subjective criteria such as black/frozen frame or audio silence events to propagate an on-screen alarm/alert to the output image (such as alert text burn-in or border alert highlighting).

The openGear® card-based form factor of the 9970-QS provides a scalable, easily integrated multi-image functions for the 20-slot frame form factor with easy to use DashBoard™ remote control. Each PiP input is provided its own independent timing alignment controls with lock to reference, allowing asynchronous inputs to be directly accommodated. An HDMI PiP output (with audio embedding) allows direct feed to a monitor.

Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. Tally can be communicated by GPI, Ethernet, or serial interfaces.

Each PiP has independent sizing control using one-button templates or easy to use custom slider controls with full control of size, position, H/V scaling, and border attributes. Burn-in insertions are independently configurable for insertion enable/disable, insertion size/position, color, background, and opacity.

Two user identity text fields per PiP. Each can be set as as user text, or to display the input video format

Independent per-PiP audio meters

Independent per-PiP timecode insertion

User-configurable reticules

Per PiP User UMD text and tally indicators

User-configurable alert annunciation with special borders and text

9970-QS

FEATURES

Scalable PiP solution. Single card provides up to 5:1 split, with up to ten 5:1 splits per frame

openGear® card-based form factor provides easy and economical integration

Easy to configure PiP sizing and borders. Advanced graphics include audio meters, character burn, and reticules. PiP sizing/splits using one-button templates or easy-to-use, intuitive DashBoard controls. Custom settings can be saved to user presets.

Fully flexible input compatibility – mixed formats on inputs can be automatically sized and outputted in a combined output scaled to desired broadcast SD/

HD/3G output format. Each input can be set for SDI or CVBS inputs. Each input automatically detects and sets up for SDI or CVBS input. Per-PIP independent SD and HD ARC settings and controls.

Supports asynchronous video inputs

Low-power/high-density design – less than 18 Watts per card

Per-PIP audio meter, tally, user text, and timecode overlays

GPI, Ethernet, and serial tally inputs provide dual, per-PIP tally indicators

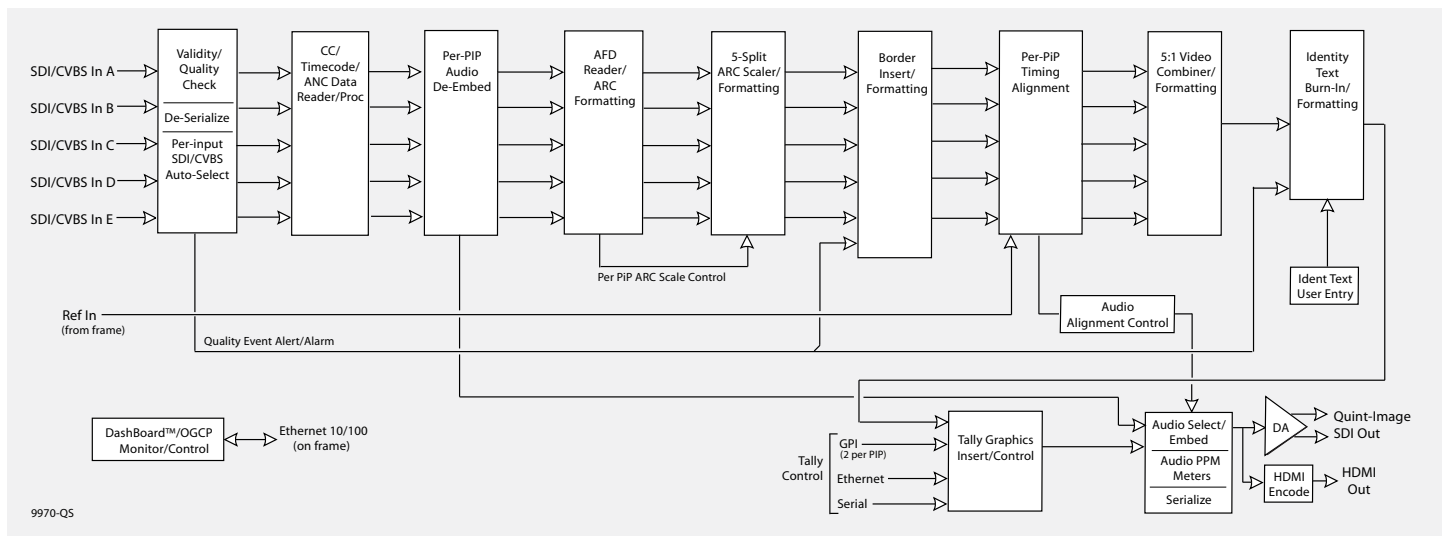
User quality criteria (such as frozen/black frame) alert/alarms can be propagated to output image with alarm text and border highlighting

Audio routing directs selected PiP audio to combined-stream outputs. Audio downmixing also provided.

3G/HD/SD-SDI 2x DA and HDMI with audio embed outputs

DashBoard™ remote control status monitoring and setup/control.

Five year warranty



Pressing the **Identify PIPs** button in DashBoard™ instantly correlates each image to its PiP card channel. The identities are clearly shown for a few seconds, after which the identify overlays automatically cancel.

9970-QS

SPECIFICATIONS

Power

< 18 Watts.

Video Input/Outputs

Video Inputs: (5) 75Ω BNC; auto-detect/setup for 3G/HD/SD-SDI or CVBS
 SDI Outputs: (2) 75 Ω BNC (2x DA) (2) 75Ω BNC (2x DA); user-selectable as 720p, 1080i, or 1080p (3G)
 HDMI Output: (1) HDMI output with audio embedding
 Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
 Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
 Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
 Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timecode Insertion/Burn-In

Independent per-PIP burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size, color, and H/V position.

Text Burn-In

Per-PIP UMD and two user identity text strings (as alternate, automatic PIP input video format can be inserted). Independent insertions controls for enable/disable. User controls for text size, color, and H/V position.

Audio Output

16-ch embedded. Per-PIP select allows routing of PIP input 16-ch embedded audio to combined SDI output. HDMI output tracks with group 1/2 audio as selected for SDI embedded audio output.

Tally Indicators/Inputs

Per-PIP dual tally indicators. (2) GPI inputs per PIP; Ethernet tally input, serial tally input. Per-PIP tally lamp position and sizing controls.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level".

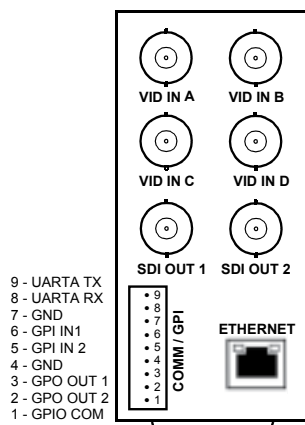
ORDERING INFORMATION

9970-QS 3G/HD/SD-SDI/CVBS Quint-Split Multi-Image Display Processor

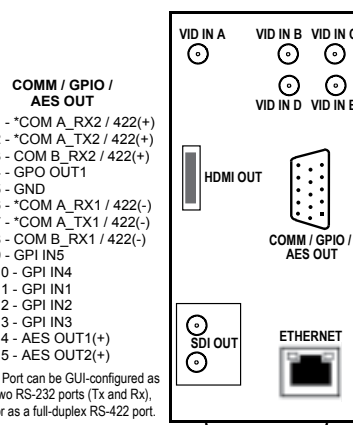
RM20-9970-B 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI/CVBS Input BNCs, (2) 3G/HD/SD-SDI Output BNCs (2xDA), COMM/GPI Port, Ethernet Port

RM20-9970-C-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI DA Outputs, COMM/GPIO/AES Out (Combined D-connector), HDMI Output, Ethernet Port (all coaxial connectors DIN 1.0/2.3)

RM20-9970-C-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI DA Outputs, COMM/GPIO/AES Out (Combined D-connector), HDMI Output, Ethernet Port (all coaxial connectors HD-BNC)



RM20-9970-B



RM20-9970-C

9978-ANC-MON » 3G/HD/SD-SDI DATA MONITORING PROBE

with Multiple-Protocol Data Payload SDI/HDMI Display & Fault Detection/Forwarding



The all-new Cobalt® 9978-ANC-MON 3G/HD/SD-SDI Ancillary Data Monitoring Probe with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding provides an easy to use, economical solution that offers comprehensive ancillary data monitoring/"probing" to validate and ensure expected presence and handling of ancillary data in SDI streams.

Unlike expensive and hard to use waveform monitors or typical test systems, the 9978-ANC-MON is an economical openGear®-based solution that provides on-screen burn-in status in "plain language" text and icons. Unlike typical test equipment, the 9978-ANC-MON user interface is designed from the ground up to be used by everyday operations personnel and not just engineers. The status burn-in is available on the card SDI output as well as a convenience HDMI output that can be directly connected to a wall monitor.

In addition to its user interface, the 9978-ANC-MON can integrate with automation systems via its serial, GPIO, IP and SNMP interfaces. The 9978-ANC-MON is an unprecedented first in the high-density openGear® based card form factor that fits in your existing openGear environment without the need for expensive, delicate, bulky test gear. Depending on the ANC data you want to monitor, the 9978-ANC-MON is available with options to support many data packages such as SCTE 104, 608-XDS, AFD and others, providing not just presence/absence status but also interpreters that parse the payload and display it as a burn-in. Options also include a continuously running display of ATSC A/85 LKFS loudness. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

Intuitive layout clearly and simultaneously showing multiple aspects of the input signal and its ancillary data are displayed in real time along with programming.

Conditions for any number of criteria are immediately apparent via color coding to indicate normal operation, errors, ancillary data absence or other errors. No difficult nested menus or difficult to interpret messages.



FEATURES

Easy to use, economical solution for comprehensive ancillary data monitoring/"probing"

"Plain language" easy to understand status burn-in overlay displayed along with program video makes status monitoring easy. HDMI output allows use with standard consumer monitor panels.

Quality Check provides immediate alert status for quality issues such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

On-screen presence/absence of selected DID/SDIDs

Fully flexible and configurable with user presets to simplify setup

Flexible options allow extra monitoring capabilities such as SCTE 104, AFD, and 608-XDS monitoring and payload interpret.

Full status forwarding to automated systems using serial, GPIO, IP, and SNMP interfaces

Audio level bars display

Low-power/high-density design - less than 18 Watts per card

Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panels

Five year warranty

OPTIONS

Closed-Captioning Metadata Interpreter (+CCINT). Extracts and interprets CC payload for burn-in and as data export via serial and/or IP

SCTE 104 Metadata Interpreter (+SCTE104INT). Extracts and interprets SCTE 104 payload for burn-in and as data export via serial and/or IP

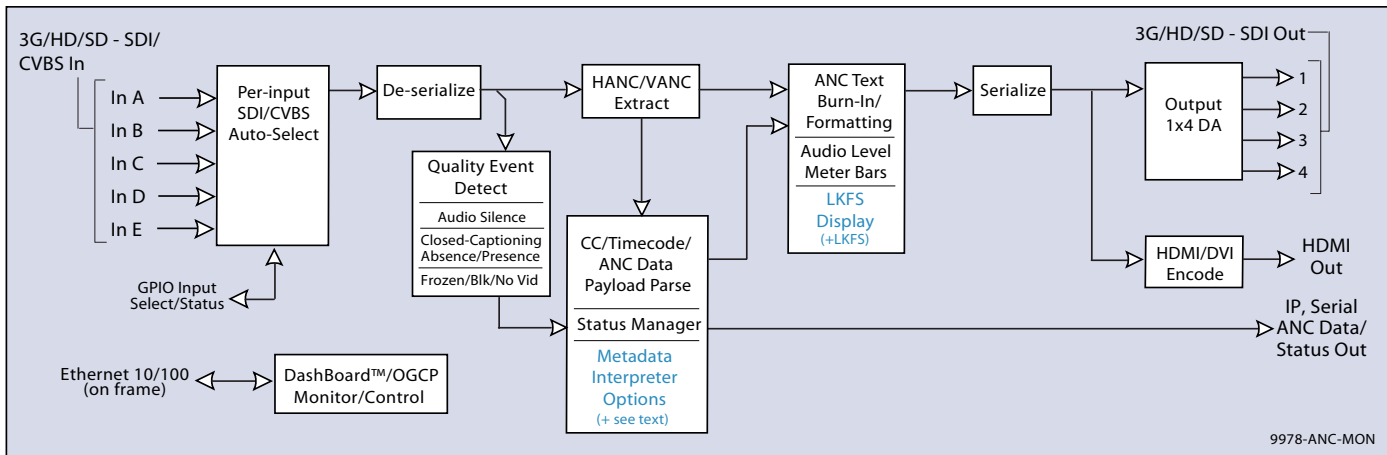
AFD Metadata Interpreter (+AFDINT). Extracts and interprets AFD payload for burn-in and as data export via serial and/or IP

CEA608 Extended Services Presence Indication (+608XDS). Displays as burn-in presence/active status for services 1-4. Also allows this status to be exported via serial and/or IP.

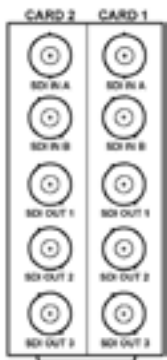
Camera Metadata Interpreter (+CAM-META). Extracts and interprets camera control metadata payload for burn-in and as data export via serial and/or IP

LKFS Measurement Option (+LKFS). Provides running LKFS display of all selected channels routed to the LKFS measurement block.

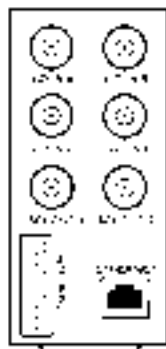
9978-ANC-MON



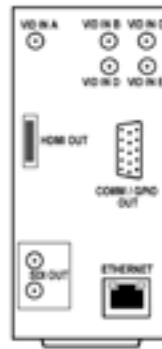
9978-ANC-MON



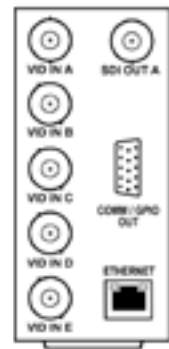
RM20-9978-AIS



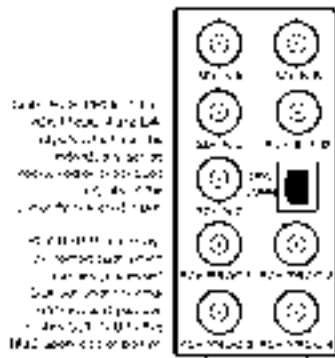
RM20-9978-B



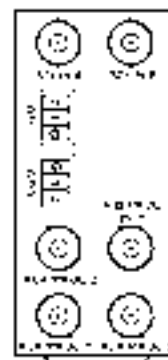
RM20-9978-C-DIN
RM20-9978-C-HDBNC



RM20-9978-D



RM20-9978-E



RM20-9978-F



9978-ANC-MON

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

Video Input/Outputs

Video Inputs: (5) 75Ω BNC; auto-detect/setup for 3G/HD/SD-SDI or CVBS |

SDI Outputs: (4) 75Ω BNC

HDMI Output: (1) HDMI output with audio embedding)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

ORDERING INFORMATION

9978-ANC-MON 3G/HD/SD-SDI Ancillary Data Monitoring Probe with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding

RM20-9978-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per Card 1 and Card 2 connector banks)

RM20-9978-B 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs, COMM/GPIO Port, Ethernet Port

RM20-9978-C-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI Outputs, COMM/GPIO (Combined HD-15 connector), HDMI Output, Ethernet Port (all coaxial connectors DIN 1.0/2.3)

RM20-9978-C-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI Outputs, COMM/GPIO (Combined HD-15 connector), HDMI Output, Ethernet Port (all coaxial connectors HD-BNC)

RM20-9978-D 20-Slot Frame Rear I/O Module (Standard-Width) (5) 3G/HD-SD-SDI/CVBS Input BNCs, (1) 3G/HD/SD-SDI Output BNC, COMM/GPIO (Combined HD-15 connector), Ethernet Port

RM20-9978-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

+AFDINT AFD Metadata Interpreter Option

+CAM-META Camera Metadata Interpreter Option

+CCINT Closed-Captioning Metadata Interpreter Option

+LKFS LKFS Measurement Option

+SCTE104INT SCTE 104 Metadata Interpreter Option

+608XDS CEA608 Extended Services Presence Indication Option

9940-ACO » DUAL-INPUT FRAMESYNC

with Auto-Changeover Input and Character Burn

The all-new Cobalt® 9940-ACO Dual-Input Framesync with Auto-Changeover and Character Burn provides a high-density card-based solution that offers unprecedented multi-input support, flexibility, and ease of use and integration. Up to 20 of the 9940-ACO cards can be installed in a 20-slot frame. Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions as well as user-configurable subjective criteria such as black/frozen frame or audio silence. Quality Check allows failover to alternate inputs based on user-configurable subjective criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS marker. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static.

Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

Full user Dashboard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

» FEATURES

Dual-input, with manual selection or intelligent Auto-Changeover failover. Latching relay bypass retains manual or failover input-to-output routing even in the event of power failure.

Auto-Changeover can be set to invoke failover for basic input loss as well as subjective failover based on black/frozen frame or audio silence. Threshold and hold-off are user configurable.

Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static

Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Low-power/high-density design allows up to 20 cards per frame - less than 18 Watts per card

Supports import of user trouble slate graphic file for LOS failover insertion

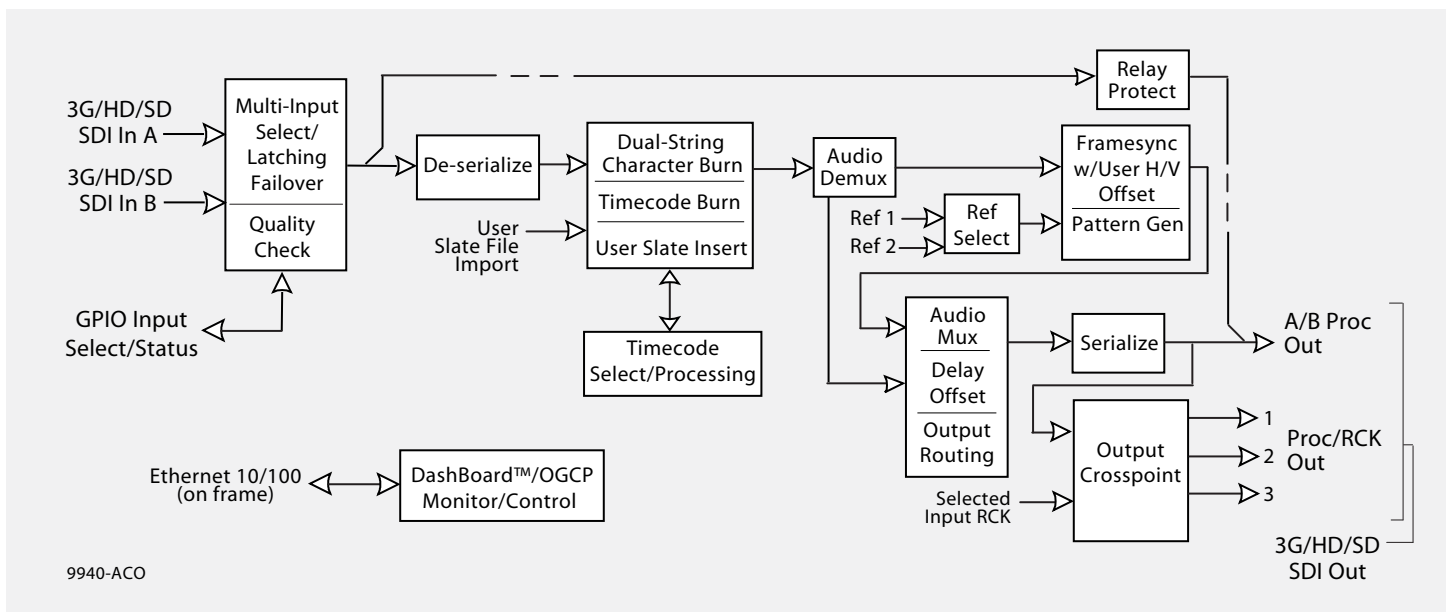
Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Framesync with full H/V offset and manual/LOS video pattern generator. Framesync can also convert raster format between 29.97/59.94 and 30/60 formats.

Full audio crosspoint with delay control available for all audio outputs

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five-year warranty



9940-ACO

9940-ACO

SPECIFICATIONS

Power

< 18 Watts

Video Input/Outputs

SDI inputs: (2) 75Ω BNC

SDI outputs: (1) 75Ω A/B BNC w/ RLY Bypass Protect.
(3) DA 75Ω BNC; selectable as selected-input RCK or processed.

Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Input Select/Auto-Changeover Failover

- Manual selection (forced) of any input.
- Failover to alternate input on loss of target input. Failover invoked upon LOS or user configurable parametric criteria such as black/frozen frame or audio silence.
- Black frame trigger configurable for black intensity threshold and persistence time.
- Frozen frame trigger configurable for frozen percentage difference and persistence time.
- Audio silence trigger configurable for dBFS floor threshold and persistence time.
- Relay latching for manually or failover selected path retains routing in loss of power conditions.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertion controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Audio Output

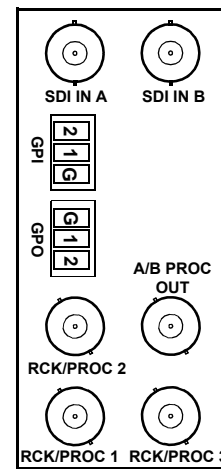
16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Downmix output available for any output channel pair. Master delay control; range of -33 msec to +3000 msec.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level"

GPIO

- (2) GPI configurable to select input routing.
- (2) GPO configurable to invoke upon input selected.



RM20-9940-C

Note: A/B PROC OUT is the card processed output which uses either input SDI IN A or SDI IN B. This output uses relay latching to retain selected routing in the event of power loss regardless of whether a selection was manually invoked or by a unit-detected failover (for example, if an auto-changeover from A to B was invoked while active, routing of input B to this output is retained in the event of power loss).

RCK/PROC 1 thru RCK/PROC 3 are DA outputs which can be individually set as relocked or processed outputs of the currently-selected input. These outputs are not relay-equipped and will lose signal in the event of power loss.

ORDERING INFORMATION

9940-ACO Dual-Input Framesync with Auto-Changeover and Character Burn

RM20-9940-C 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as processed or relocked of selected input, (2) GPI, (2) GPO

+LTC Audio LTC I/O Option

9940-4X1-CS » 3G/H/SD-SDI CLEAN AND QUIET BYPASS ROUTER

with Relay-Protected Input and GPIO Monitoring/Control



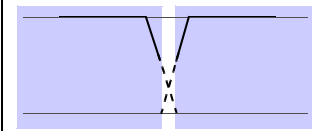
The all-new Cobalt® 9940-4x1-CS 3G/H/SD-SDI 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control provides Clean & Quiet routing in a high-density card-based openGear® solution. The Clean & Quiet routing not only provides switching on the RP168-specified VANC switch line, but also provides audio cross-fade upon switches to provide video switches free of switching artifacts, and provides dead-quiet audio between switches.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. Also Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected. Option +QC provides user-configurable Video Quality Event intelligent assessments such as black/frozen frame or audio silence. Video Quality or Closed-Captioning event status can independently be propagated for each event type as GPO, automated alert email, input routing changes, or card user presets you can configure to provide any number of special actions such as routing changes or burn-in text alert messages.

Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Any of several standard test patterns can be inserted as an input LOS marker. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even when the input video image is static. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. Full user Dashboard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

Quiet Cross-Fade pulls audio to floor and gracefully reverts to normal level during input routing changes



FEATURES

Clean & Quiet Routing ensures program video switches free from video artifacts and audio clicks or pops

Multi-input, with manual selection or intelligent Auto-Changeover failover

Closed-captioning absence detection

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides alert actions on criteria such as black/frozen frame, audio silence, and closed-captioning absence. Threshold and hold-off are user configurable.

Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static

Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Input selection and status can be propagated via GPIO, serial, or IP interfaces

Video options include color correction

Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty

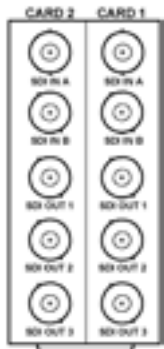
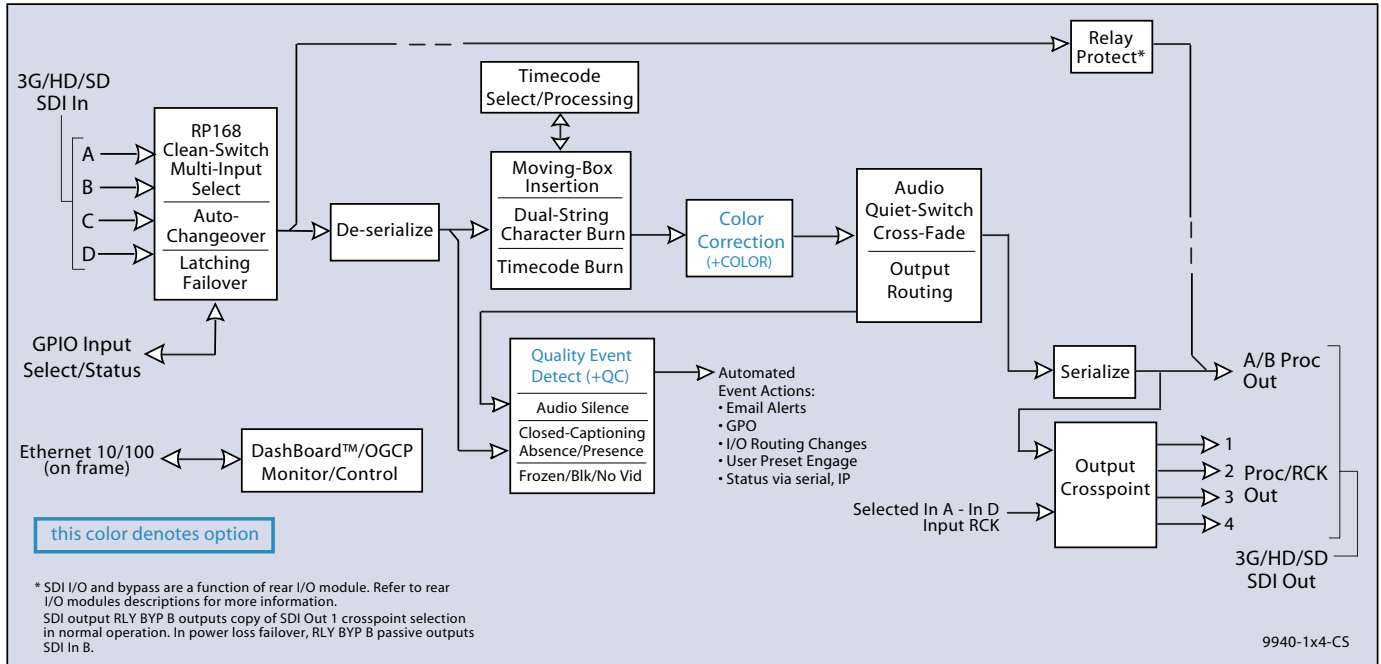
OPTIONS

Quality Check (+QC). Provides failover on criteria such as black/frozen frame or audio silence.

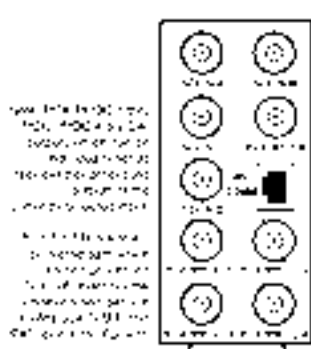
Color Correction (+COLOR). Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

openGear

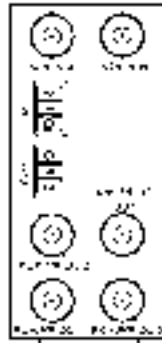
9940-4X1-CS



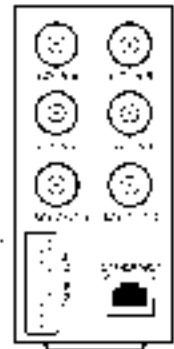
RM20-9940-AIS



RM20-9940-C



RM20-9940-F



RM20-9940-G

9940-4X1-CS

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

ORDERING INFORMATION

9940-4X1-CS 3G/HD/SD-SDI 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control

RM20-9940-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (2) 3G/HD/SD-SDI Input BNC, (3) 3G/HD/SD-SDI Processed or Reclocked Output BNCs (connections are per Card 1 and Card 2 connector banks)

RM20-9940-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), (1) GPIO/COMM RJ-45 connector

RM20-9940-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs, (2) GPI, (2) GPO

RM20-9940-G 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Input BNCs, (2) 3G/HD/SD-SDI Output BNCs, COMM/GPIO Port, Ethernet Port

+QC Quality Check Option. Provides failover on subjective criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

+COLOR Color Correction Option

9362 » HD/SD-SDI TEST SIGNAL GENERATOR

with Text Overwrite, SDI Input Frame Capture/Store, and Fail Safe Mode



The 9362 is an HD/SD-SDI multi-format test signal generator that provides a user-selectable test pattern in several SD and HD-SDI formats. The 9362 is installed in the HD/SD-SDI feed and passes the video signal as normal when not needed. In the event of video signal loss, the test signal generator function can be set to switch to a selected pattern manually, or set to provide a selected pattern.

The 9362 can overlay up to 20 characters of text onto the test pattern for channel ID. The SDI outputs can either be locked to a reference signal connected to the openGear® frame, or run off an internal clock. The 9362 can capture and store a frame such as a station ID logo from the HD/SD-SDI input and use this as a selectable test pattern.

» FEATURES

75% Color Bars, Black Flat Frame, Sweep Pattern, and User-Captured Freeze Frame Test Patterns

Up to 20 character text overlay

Locks to external reference (bi-level, black burst, or tri-level)

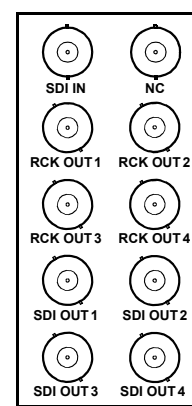
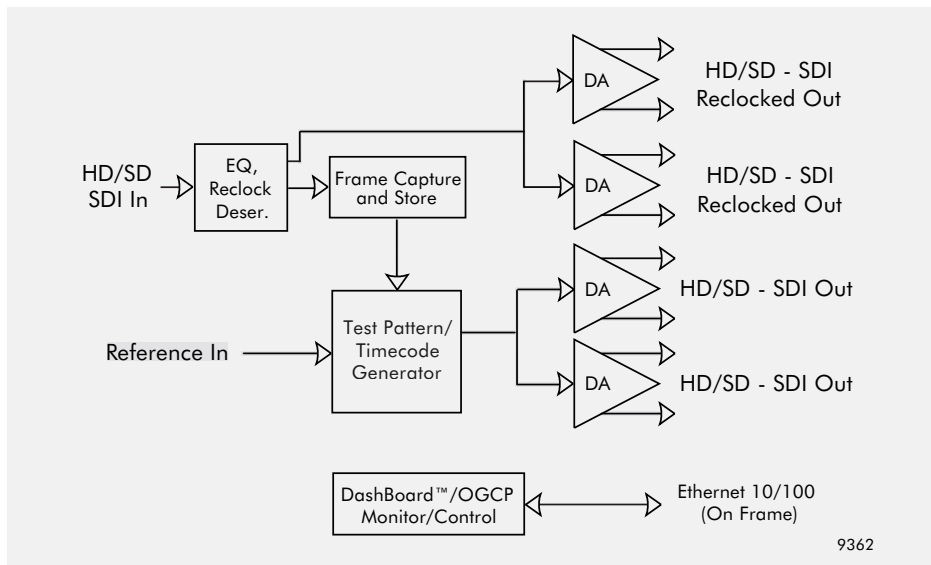
Controllable timing offset from reference

Timecode generator can insert ATC_VITC, ATC_LTC, or VITC waveform timecode with user-configured count when pattern generation is active

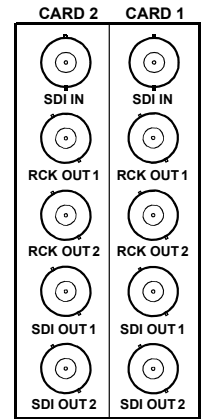
Four tone generators with selectable frequency and level, allow tone insertion when pattern generator is active

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panel

Five-year warranty



RM20-9362-A



RM20-9362-A/S

» SPECIFICATIONS

Electrical

Power: 8 watts

HD/SD-SDI Input

Number of Inputs: 1
Standard: SMPTE 292 and 259M
Return Loss: >15 dB at 5 MHz - 1.485 GHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

Test Patterns

HD/SD: Black flat frame, 75% Color Bars, Sweep Pattern, User Captured

HD/SD-SDI Output

Number of Outputs: 4 reclocked, 4 processed
Standard: SMPTE 292 and 259M
Signal Level: 800 mV nominal
Return Loss: >15 dB at 5 MHz - 270 MHz
>12 dB at 270 MHz - 1.485 GHz
Jitter: HD: < 0.15 UI
SD: < 0.10 UI
Embedded Audio: 16-Ch SD/HD

» ORDERING INFORMATION

9362 HD/SD-SDI Test Signal Generator with Text Overwrite, SDI Input Frame Capture/Store, and Fail Safe Mode

RM20-9362-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 SDI Reclocked Outputs, 4 SDI Outputs

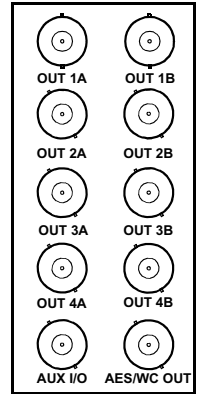
RM20-9362-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input, 2 SDI Reclocked Outputs per card, 2 SDI Outputs per card



9363 » MULTI-FORMAT REFERENCE GENERATOR



The highly flexible 9363 generates four reference signal pairs that are independently configurable as composite black burst or tri-level reference sources. Each output can be any industry standard rate related to a received input reference source, or can be generated using the card's highly stable internal clocking source. Timing for each output pair can be independently offset (in vertical lines or horizontal pixels) from the received reference or internal clock.



RM20-9363-A

» FEATURES

Flexible, single-card source for any NTSC or PAL SD/HD broadcast or film reference rate

Develops output reference using external analog reference or stand-alone internal clock source

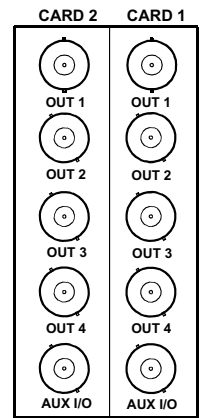
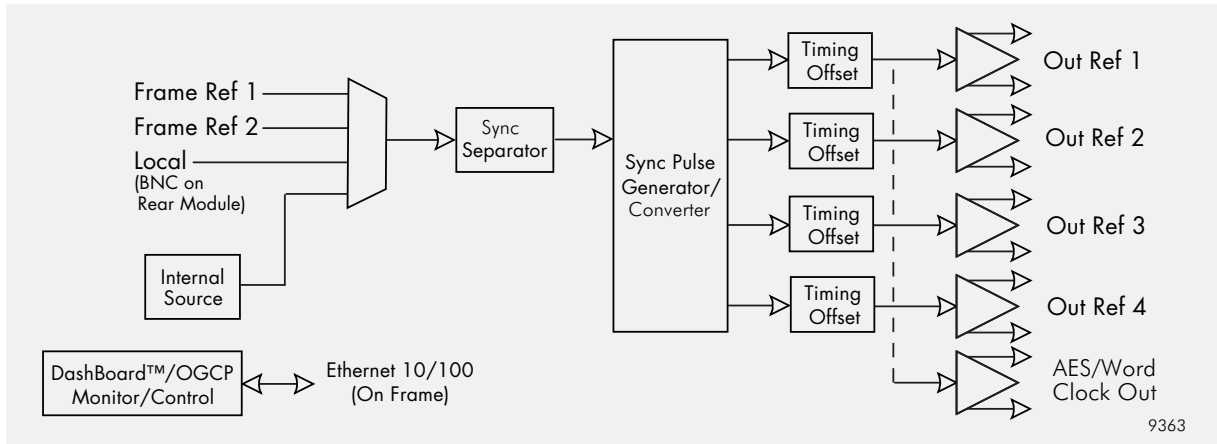
Outputs can be independently set for frame rate and delay relative from input/internal reference, or from each other

Remote control/monitoring via Dashboard™ software

Genlock to output rates of 1:1, 1:2, or 2:1 relationship with clock source. Field Lock for interlaced format outputs from progressive clock sources.

AES/Word Clock output synchronized to any of the four card reference outputs

Five-year warranty



RM20-9363-A/S

» SPECIFICATIONS

Electrical
 Power: 6 watts
 Reference Input Impedance: 75 Ω
 Standard: SMPTE 274M, 296M, 170M; ITU-R BT.470-6 (PAL-B)
 Return Loss: >40 dB to 10 MHz

Reference Outputs
 Reference Outputs: 4 pairs max. (each pair independently configurable)
 Signal Level: 1 Vp-p
 Impedance: 75 Ω
 Return Loss: >40 dB to 30 MHz
 Internal Clock Count Stability: 1 ppm initial (4.6 ppm 10 years; all conditions within specifications)
 Thermal Stability: ±0.25 ppm (0° to 70° C)

AES/Word Clock Output
 Signal Level: 1 Vp-p
 Impedance: 75 Ω
 Return Loss: >25 dB to 10 MHz
 AES Sample Rate: 48 kHz

» ORDERING INFORMATION

9363 Multi-Format Reference Generator

RM20-9363-A 20-Slot Frame Rear I/O Module (Standard Width) BNC Analog Reference Input or AES/Word Clock Output (configurable), 4x2 BNC Analog Reference Outputs, dedicated AES/Word Clock BNC Output

RM20-9363-A/S 20-Slot Frame Rear I/O Module (Split) Dual BNC Analog Reference Input or AES/Word Clock Output (configurable), 4 BNC Analog Reference Outputs per card



9960-TG2-REF1 » 3G/HD/SD-SDI DUAL TEST SIGNAL GENERATOR

with Bouncing Box Active Signal Indication, Bi/Tri-Level Sync Out, and Embedded ANC Data Signal Generator



The all-new Cobalt® 9960-TG2-REF1 3G/HD/SD-SDI Dual Test Signal Generator with Bouncing Box Active Signal Indication, Bi-Level Sync Out, and Embedded ANC Data Signal Generator offers an easy to use, economical solution to providing comprehensive test signal packages to ensure validity of downstream baseband SDI systems. The 9960-TG2-REF1 is an unprecedented first in the high-density openGear® based card form factor. Two independent generator blocks can be set to offer dual test packages which can be simultaneously outputted or selectively fed to a single downstream path via a 2x4 output crosspoint.

In addition to numerous high-quality industry-standard test patterns, the 9960-TG2-REF1 also provides ANC data generators that are designed to thoroughly check all standard ANC packages (including CEA 608/708 closed captioning, SMPTE 12M timecode, SMPTE 2020 HANC audio, and SMPTE 2010 SCTE 104 test packets). Custom DID/SDID packages can be added to test non-conventional or custom processing. An ingenious Stress-Test Generator can send intentional error-bearing packets that help flush out unexpected error handling problems in

downstream systems – errors are discovered and remedied in testing and setup instead of when carrying on-air programming.

The 9960-TG2-REF1 also provides AES and analog audio test tones (both using 24-bit data), and also provides waveform-based test data over its CVBS video output. A moving-box insertion can be enabled to serve as a dynamic raster confidence check. The 9960-TG2-REF1 can use either of two frame references to provide an output that's synchronous with house ref, or use its internal ref timing to generate its own ref. A CVBS output offers tri- / bi-level reference output, line 21 CEA 608 closed-captioning and VITC waveform test sequences. Audio LTC test sequences are available over embedded, AES, and analog audio as well as via an RS-485 serial port.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern while not changing any other settings or aspects. Full user Dashboard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

Comprehensive test signal generation for SDI/analog video and baseband discrete audio in an easily integrated openGear® card

Easy to use, intuitive, flexible, and far more economical than typical bench equipment

Fully-independent dual generator blocks offer simultaneous output of user-configured test packages, or instant user selection between generators via output crosspoint

Full array of test stimulus for SDI, including CEA608/708, packetized and waveform timecode, SCTE 104, and AFD

Moving-box/motion insertion enable serves as an easy to use dynamic raster confidence check

DID/SDID authoring allows custom payloads to be written to specific DID/SDID locations as test packets for downstream systems

Stress-Test generators provide illegal character, TRS, line length and other error cases that help flush out surprises in downstream error handling tolerance and robustness

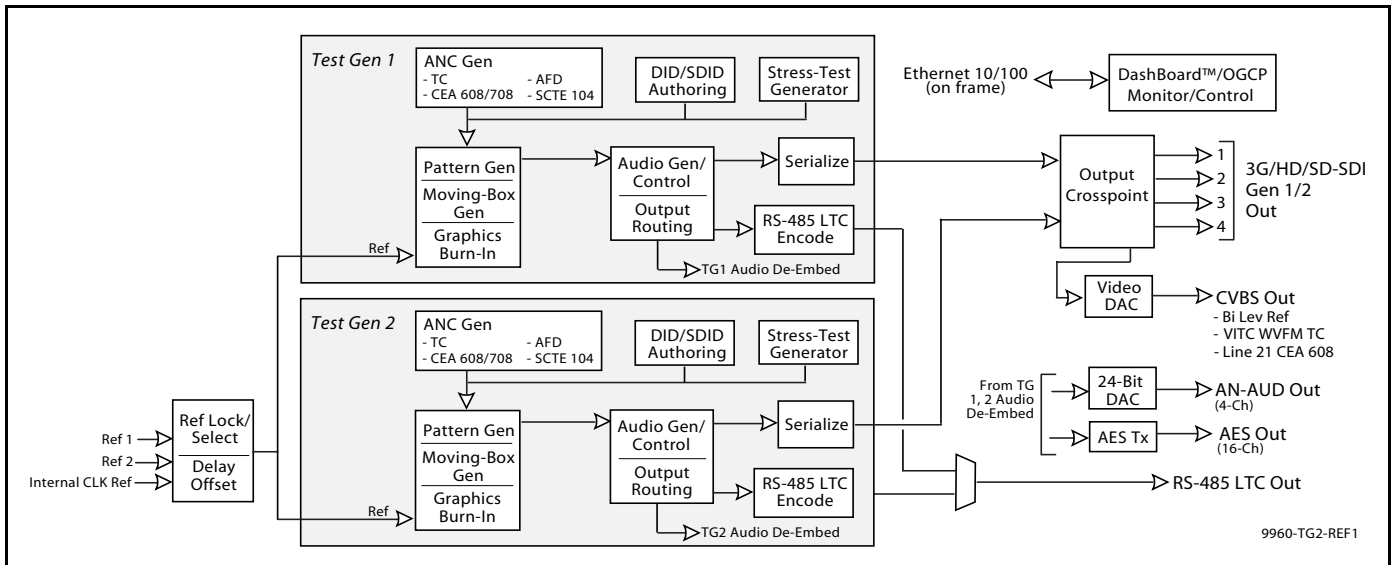
Full suite of output interfaces – SDI, CVBS, AES and analog audio.

Convenience RS-485 LTC output works with legacy systems and checks bi-phase LTC/SMPTE 12 correlation in mixed systems

Low-power/high-density design – less than 18 Watts per card

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

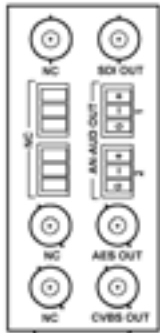
Five year warranty



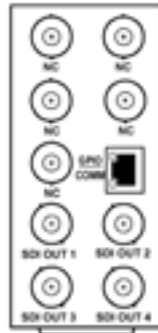
9960-TG2-REF1



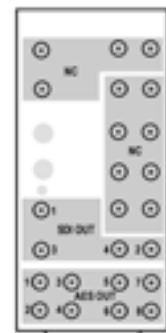
RM20-9960-A/S



RM20-9960-B



RM20-9960-C

RM20-9960-D-DIN
RM20-9960-D-HDBNCRM20-9960-E-DIN
RM20-9960-E-HDBNC

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power

< 18 Watts

SDI Outputs

Up to (4) 75Ω BNC outputs

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

CVBS Video Output

(1) 75Ω BNC output. CVBS output functional only when selected path is carrying SD-SDI.

Discrete Audio Outputs

AES-3id 75? outputs (8 pair (16-Ch) max)

Balanced analog audio outputs (4-Ch max)

(I/O conforms to 0 dBFS = +24 dBu)

Analog Output Impedance: < 50 Ω

Analog Reference Level: -20 dBFS

Analog Nominal Level: +4 dBu

Analog Max Output Level: +24 dBu (0 dBFS)

Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

Analog SNR: 115 dB (A weighted)

Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)

Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video

SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls.

Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M. Return Loss: >35 dB up to 5.75 MHz

ORDERING INFORMATION

9960-TG2-REF1 3G/HD/SD-SDI Dual Test Signal Generator with Bouncing Box Active Signal Indication, Bi-Level Sync Out, and Embedded ANC Data Signal Generator

RM20-9960-A/S 20-Slot Frame Rear I/O Module (Split; supports 2 cards) (3) 3G/HD/SD-SDI Output BNCs (connections are per Card 1 and Card 2 connector banks)

RM20-9960-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Out BNC, (1) AES Out BNC, (2) Balanced Analog Audio Outputs

RM20-9960-C 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Output BNCs (1) GPIO/COMM RJ-45 connector

RM20-9960-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9960-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

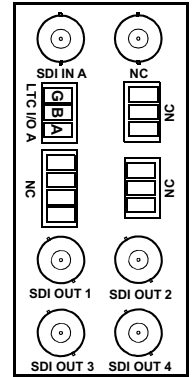
RM20-9960-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9960-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC.)

9391 » 3G/HD/SD-SDI TIMECODE BURN-IN INSERTER



The 9391 3G/HD/SD-SDI Timecode Burn-In Inserter allows SMPTE embedded or RS-485 LTC to be burned onto SDI video. The card can burn timecode and up to 16 characters of static text onto program video. A failover/manual select function provides for a user-selectable flat-field to replace program video either as a manual selection or upon loss of input video. The generated flat-field can be timed to input video, or to a frame reference signal. Timecode burn-in and text can be sized and positioned anywhere in the active video area using easy-to-use positioning controls. **The 9391 also includes a 2x4 SDI output crosspoint, with processed or relocked input video routable to up to four SDI outputs.**



RM20-9391-D

» FEATURES

Economical, single-card solution for timecode burning

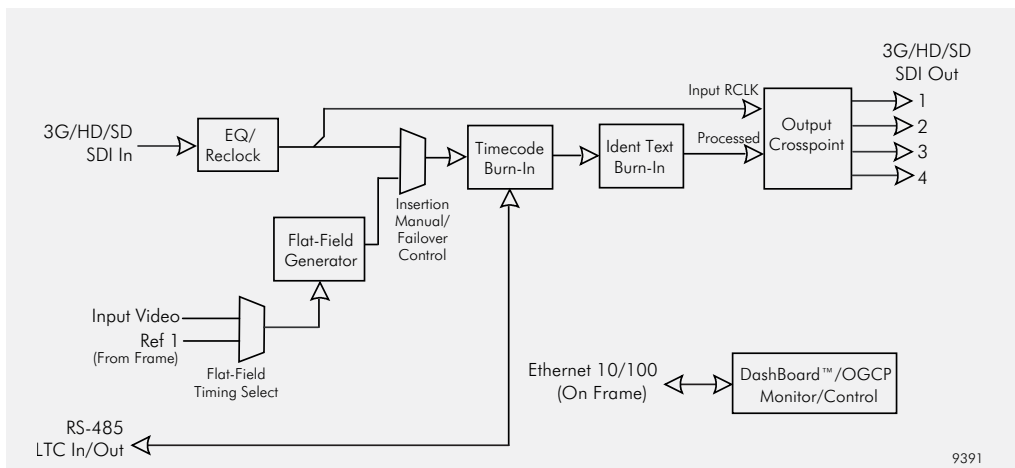
Full timecode support – burn-in timecode from selected SMPTE embedded formats or RS-485 LTC. Free-run (self generated) timecode can be set for count-up or count-down with wrap or halt at zero count.

Easy to configure manually invoked or automatic failover flat-field generation. Also provides identification text burn-in.

3G/HD/SD-SDI compatible. Generated flat-field can match input format, or be set to provide any of several output formats regardless of input video format.

Convenient built-in 2x4 SDI output crosspoint DashBoard™ and OGCP-9000 remote control simplifies setup and operation

Five-year warranty



LTC timecode and static ID text burn-in size and position configurable.

Timecode can be set for:
sec; sec:frames; sec:frames:field

» SPECIFICATIONS

Power < 25 Watts

Timecode Insertion

Uses RS-485 LTC source, with free-run failover in absence of external LTC. Free-run start time can be user configured. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frame:field. User controls for text size and H/V position.

Flat Field Insertion

Enable/disable manual user controls, with selectable failover upon loss of input video. Flat-field output format is user selectable. Flat-field raster color selectable from nine colors.

Identification Text Insertion

Enable/disable manual user controls. Up to 16 ASCII character entry field. User controls for text size and H/V position.

Video Input/Output

SDI inputs: (1) 75Ω BNC
SDI outputs: (4) 75Ω BNC via 2x4 crosspoint
Formats (pass-thru and burn-in/flat-field):
SD: 486i59.94, 576i50
HD: 1080i59.94, 1080i50, 1080p24, 1080p23.98, 1080psf24, 1080psf23.98
720p59.94, 720p50, 720p24, 720p23.98
3G: SMPTE 425A: 1080p59.94, 1080p50
Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz
>10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

LTC Input

3-terminal Phoenix connector, supporting RS-485 LTC input (- (A), +(B), GND)

Frame Reference Input

Signal: SMPTE 170M/318M "Black Burst"
SMPTE 274M/296M "Tri-Level"
Return Loss: >35 dB up to 5.75 MHz

Processing Latency

Less than 25 samples



» ORDERING INFORMATION

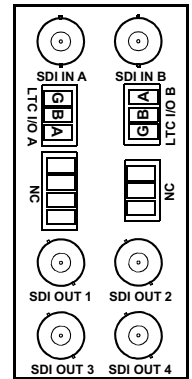
9391 3G/HD/SD-SDI Timecode Burn-In Inserter

RM20-9391-D RM20-9391-D 20-Slot Frame Rear I/O Module (Standard Width) 3G/HD/SD-SDI Input, RS-485 LTC Input/Output, (4) 3G/HD/SD-SDI Outputs (crosspoint selectable)

9392 » 3G/HD/SD-SDI DUAL-CHANNEL TIMECODE BURN-IN INSERTER



The 9392 3G/HD/SD-SDI Dual-Channel Timecode Burn-In Inserter allows individual SMPTE embedded timecode or RS-485 LTC inputs to be burned onto two respective, independent SDI video streams. The card can burn timecode and up to 16 characters of static text onto program video. Independent, per-channel failover/manual select function provides for a user-selectable flat-field to replace program video either as a manual selection or upon loss of input video. The generated flat-field can be timed to input video, or to a frame reference signal. Timecode burn-in and text can be sized and positioned anywhere in the active video area using easy-to-use positioning controls. **The 9392 also includes a 3x4 SDI output crosspoint, with SDI Out A (channel A), SDI Out B (channel B), or relocked SDI In A routable to up to four SDI outputs.**



RM20-9392-D

» FEATURES

Economical, single-card solution for timecode burning

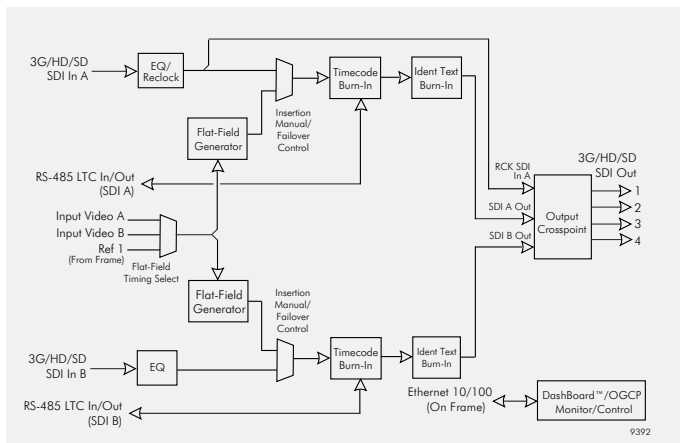
Full timecode support – burn-in timecode from selected SMPTE embedded formats or RS-485 LTC. Free-run (self generated) timecode can be set for count-up or count-down with wrap or halt at zero count.

DashBoard™ and OGCP-9000 remote control simplifies setup and operation

Provides timecode burn-in for two SDI streams. Also provides identification text burn-in, with independent text entry and attribute controls for each SDI channel. Supports independent LTC input for each program video channel. Easy to configure manually invoked or automatic failover flat-field generation.

3G/HD/SD-SDI compatible. Generated flat field can match input format, or be set to provide any of several output formats regardless of input video format. Each channel can be individually configured for failover and output formats. Convenient built-in 3x4 SDI output crosspoint

Five-year warranty



LTC timecode and static ID text burn-in size and position configurable.

Timecode can be set for: sec; sec:frames; sec:frames:field

» ORDERING INFORMATION

9392 3G/HD/SD-SDI Dual-Channel Timecode Burn-In Inserter

RM20-9392-D RM20-9392-D 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (2) RS-485 LTC Inputs/Outputs, (4) 3G/HD/SD-SDI Outputs (crosspoint selectable)

» SPECIFICATIONS

Power < 25 Watts

Timecode Insertion

Uses RS-485 LTC source, with free-run failover in absence of external LTC. Free-run start time can be user configured. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frame:field. Independent controls and LTC inputs for each SDI input channel.

Identification Text Insertion

Enable/disable manual user controls. Up to 16 ASCII character entry field. User controls for text size and H/V position. Independent controls for each SDI channel.

LTC Input

(2) 3-terminal Phoenix connectors, supporting independent (per channel) RS-485 LTC input (- (A), +(B), GND)

Flat Field Insertion

Enable/disable manual user controls, with selectable failover upon loss of input video. Flat-field output format is independently user selectable for each output channel. Flat-field raster color selectable from nine colors.

Note: Both program video inputs must be of the same refresh rate (e.g., 59.94 or 50, or co-related (29.97 or 25)), and co-synchronous using frame sync or similar means. In practical application, both inputs should be frame-synchronized using a common frame reference, with the same reference also to be used by this card.

Frame Reference Input

Signal: SMPTE 170M/318M "Black Burst"
SMPTE 274M/296M "Tri-Level"
Return Loss: >35 dB up to 5.75 MHz

Video Input/Output

SDI inputs: (2) 75Ω BNC
SDI outputs: (4) 75Ω BNC via 3x4 crosspoint
Formats (pass-thru and burn-in/flat-field):
SD: 486i59.94, 576i50
HD: 1080i59.94, 1080i50, 1080p24, 1080p23.98, 1080psf24, 1080psf23.98
720p59.94, 720p50, 720p24, 720p23.98
3G: SMPTE 425A: 1080p59.94, 1080p50

Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
Return Loss: >15 dB up to 1.485 GHz
>10 dB up to 2.970 GHz
Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Processing Latency

Less than 25 samples

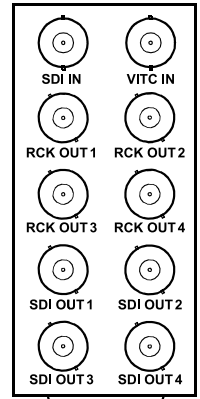
9381 » HD/SD-SDI TIMECODE INSERTER



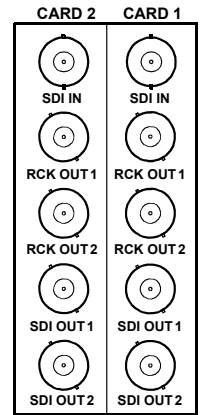
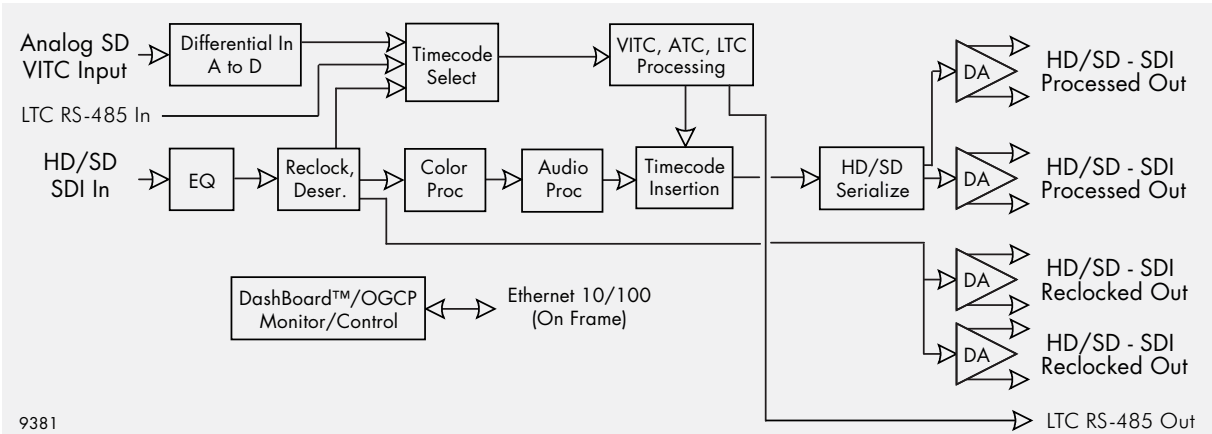
The 9381 provides centralized timecode support, allowing conversion and insertion of VITC waveform, ATC_VITC, and ATC_LTC timecode on the SDI output. Timecode can be extracted from the SDI input, analog video input, or embedded audio LTC sources and applied to the SDI output as waveform or ATC-based timecode as applicable. The card also provides embedded audio routing and controls, and full video processing control with user memory.

» FEATURES

HD/SD-SDI inputs	VITC waveform-to-HD SDI ATC. Bi-directional conversion between ANC timecode formats and audio/RS-485 LTC.	16 user presets	Five-year warranty
Video processing controls		Remote control/monitoring via DashBoard™ software or OGCP-9000 control panel	
AFD code insertion			



RM20-9381-A



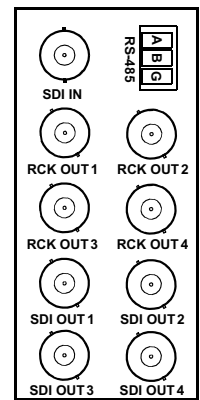
RM20-9381-A/S

» SPECIFICATIONS

Electrical		HD/SD-SDI Output	
Power:	11 watts	Number of Outputs:	4 processed, 4 reclocked
Analog Video Input		Standard:	SMPTE 292 and 259M
SD Standard:	Composite	Signal Level:	800 mV nominal
Impedance:	75 Ω	Return Loss:	>15 dB at 5 MHz - 270 MHz >12 dB at 270 MHz - 1.485 GHz
Processing Delay		Jitter:	HD: < 0.15 UI SD: < 0.10 UI
Total Delay:	3.2 μ	Embedded Audio:	16-Ch SD/HD
Timecode Processing			
Formats Inserted:	Analog VITC, SDI VITC, SDI ATC LTC, SDI ATC VITC		

» ORDERING INFORMATION

9381 HD/SD-SDI Metadata/Timecode Inserter	RM20-9381-A/S 20-Slot Frame Rear I/O Module (Split) Dual HD/SD-SDI Input, 2 HD/SD-SDI Reclocked Outputs per card, 2 HD/SD-SDI Processed Outputs per card	RM20-9381-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs, RS-485 LTC I/O Port
RM20-9381-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs		



RM20-9381-B



LOUDNESS METERING SOFTWARE OPTIONS

Cobalt's Loudness Meter software works with the award-winning OGCP-9000 Remote Control Panel and our new WinOGCP Desktop Virtual Control Panel to provide a flexible, complete solution for ingest or on-air loudness metering, assessment, and records. An intuitive touch screen control interface offers simple "pushbutton" session start and stop along with clear-cut pass/fail loudness assessment for QC operators.



OGCP-9000 REMOTE CONTROL PANEL WITH +LM

True peak level detection, error tracking and logging, and other detailed criteria offer detailed assessments and logging for admin/engineering. Configurable automatically triggered sessions and report generation (timecode range, signal level-based, and automatic daily session start/stop/restart) provide for automation-based session and records generation to help document compliance with loudness regulations.

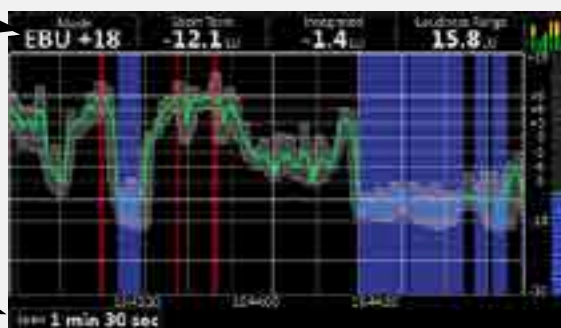
Easy to use, yet comprehensive, the option ensures thorough audio level and loudness assessment, and is ITU BS.1770, ATSC A/85, and EBU R128 compliant. Because cards forward the audio measurement data to the control panel over your plant's Ethernet network, the control panel does not need co-location or insertion within the video/audio stream.

The Audio Loudness Meter software works with Fusion3G® and most 9000 series COMPASS® cards. The software can be ordered with product purchase, or purchased for cards already installed and activated using a downloadable feature key (no need to remove or replace cards).

Loudness Metering graphing display mode shows a historical plot of loudness over a selectable time span from 45 seconds to 24 hours. Where loudness deviates from user-configurable thresholds, these conditions are clearly displayed by a red background or blue background (respectively indicating over-level or under-level intervals).

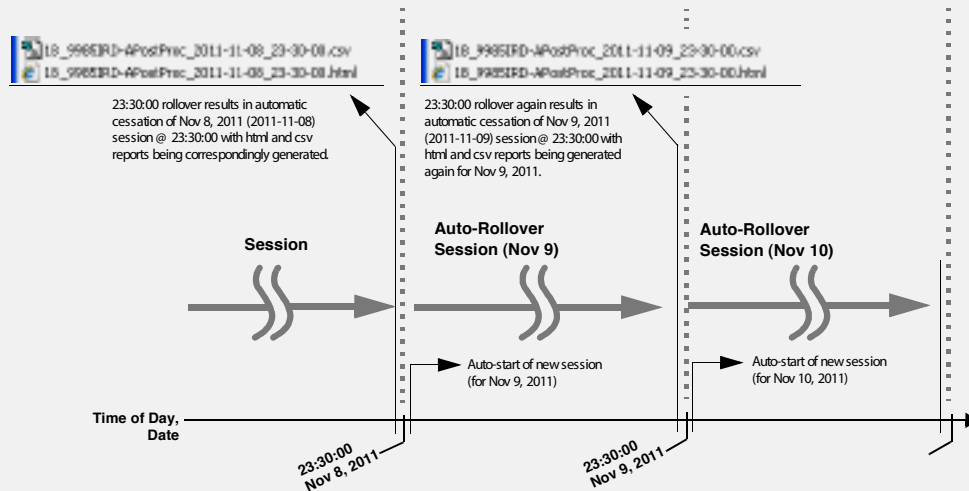
- Multiple user-selectable loudness metering modes:
- EBU +18
 - EBU +9
 - A/85
 - Custom

User-adjustable **Span** sets the "look-back" time span displayed ("live" plot always starts on the right margin)



Instantaneous loudness level and PPM confidence displays

Sessions can be set to stop (wrap-up and close session) and then immediately restart (start a new session) at a specified time within the 24-hour day. This allows for very orderly, consistent reports that are automatically generated on a daily basis, with each report subsequently having identical start /stop times and durations. The automatically generated log files (generated in both .csv and .html formats) can serve as records to document compliance with loudness regulations. The session rollover is fully automatic with no intervention required.



LOUDNESS METERING SOFTWARE OPTIONS

FEATURES

ITU BS.1770, ATSC A/85, and EBU R128 compliant

Intuitive user interface with touch screen control

Eight channel PPM metering

Comprehensive error tracking and logging

Automated session generation via daily rollover stop/restart, timecode range, and signal-level threshold triggering

Accommodates any combination of audio sources handled by host card: embedded, AES, analog, or decoded Dolby® E, Dolby Digital, or Dolby Digital Plus

True peak level detection

Loudness error analysis suitable for live, post production and ingest environments

Flexible monitoring modes include configurable dBFS bar graph meters, loudness displays and error thresholds

Detailed web-browser session log reports with CSV raw data output available

Pre/post metering allows comparison of card pre and post loudness-processed streams (available on 9086 and all Fusion3G® cards)

Session	
Loudness Meter ID	9995 IRD-A Post Proc
Start Date and Time	12/16/2011 14:29:41
End Date and Time	12/17/2011 14:29:50
Session	
Average	-24.8 LKFS / 2.2 Δ from target
Calculated Recommendation	ACCEPT

The Loudness Meter generates a report (in both .html and .csv formats) whenever a session is manually or automatically conducted.

Shown here is a summary example of a generated session report. Loudness metering and log reports can be set up to flag numerous loudness-related data (the most basic being loudness exceeding a threshold delta (Δ) from the target LU value as shown here).

To further assist in ready assessment of a report, these configurable deltas can be used to unambiguously tag a session as ACCEPT or REJECT.

If any errors exceeding user-defined thresholds occur, these errors are listed in a detailed log.

In a session where errors were logged, the **Error Log** displays a list of the errors, along with error type and session/timecode correlation, and offending channel(s) where applicable.

Error No.	Timecode	Category	Timecode	Loudness	Error Duration	Error Type	LKFS	L	R	C	LA	RA
1	00:00:03.5	02:28:58.18	16:46:21	00:00:03.3	HIGH	15.5	65.9	64.8	11.7	< -150	30.0	25.4
2	00:00:08.8	02:29:03.28	16:46:26	00:00:08.9	PK	---	---	---	-0.10	---	---	---
3	00:00:09.0	02:29:04.02	16:46:26	00:00:10.5	HIGH	8.9	66.1	64.5	-1.1	< -150	30.0	25.4

SPECIFICATIONS

Standards

ITU BS.1770, ATSC A/85, and EBU R128

LKFS Scale Range

0 to -70 LKFS

Audio Input

8-Ch confidence monitoring
5-Ch (L, R, C, Ls, Rs) LKFS assessment per ITU 1770 and ATSC A/85 and EBU R128
Accommodates embedded, AES, analog decoded Dolby®E or AC-3 audio per host card

dBFS Scale Range

0 to -70 dBFS; absolute or configurable relative

Averaging

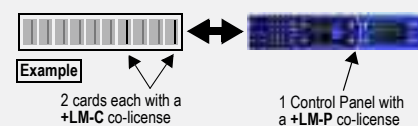
Simultaneous session (infinite) and short-term; configurable short-term averaging period

ORDERING INFORMATION

+LM-P Audio Loudness Metering Software Co-License for OGCP-9000 or WinOGCP

+LM-C Audio Loudness Metering Software Card Co-License. Pre/post metering available only with 9086 and all Fusion3G® cards.

To allow you to provision loudness metering on a card-by-card and panel-by-panel basis suiting your needs, host cards and control panels use individual co-licenses. **Co-licenses are required on both the host card(s) and Control Panel(s)**, with card +LM-C co-licenses and panel +LM-P co-licenses comprising the overall option.



OGCP-9000 2RU Remote Control Panel for Fusion3G®/COMPASS® Cards (Specify country of destination for power cord)

WINOGCP Virtual Desktop-based Remote Control Application for Fusion3G®/COMPASS® Cards

+LP LOUDNESS PROCESSOR SOFTWARE

+LP options add 5.1-channel or stereo loudness processing to any Fusion3G® card, or any of numerous Compass® cards. Using Linear Acoustic® AEROMAX® technology, loudness control is applied on up to six channels of audio from any embedded, AES, or analog inputs sourced by the host card.

AEROMAX® algorithms use a sophisticated multiband approach to loudness processing. These algorithms can apply multi-faceted loudness correction specifically targeted to various frequency ranges and other characteristics within the program material, resulting in audio free from abrupt loudness or image shifts while preserving more of the original

content than available using less refined approaches. Because +LP processes audio loudness locally and in sync with the video, loudness is processed without the large accumulated latency delay found in other loudness processors.

Adding loudness processing is a simple software upload to the card, requiring less than one minute downtime and no removal of the card from its frame. Option +LP economically leverages from existing card functions and adds loudness processing with no added hardware or signal routing changes.

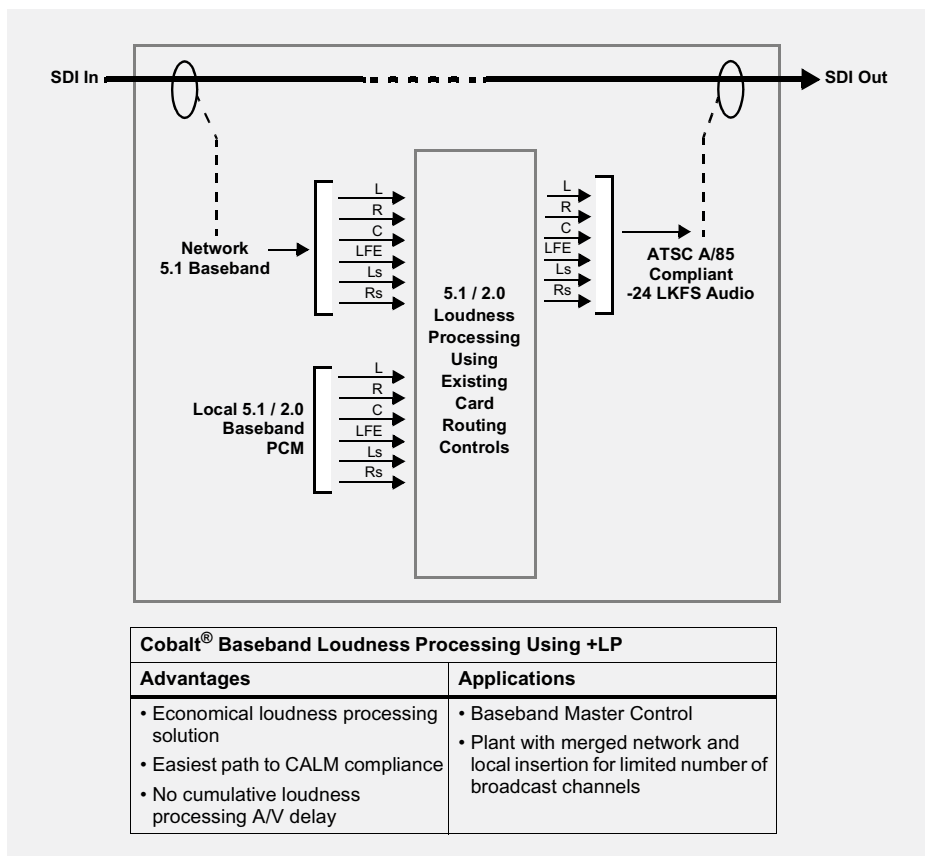
FEATURES

High-quality, seamless Linear Acoustic® AEROMAX® loudness processing

Available for new cards or can be added to existing cards with simple software upload

Default set to provide ATSC A/85 -24 LKFS loudness when used with AC-3 -24 dialnorm; no parametric setup required

Multiple user-selectable loudness profile preset choices with configurable target LKFS



+LP LOUDNESS PROCESSOR SOFTWARE

ORDERING INFORMATION

+LP51 5.1 Loudness Processor (for Compass® Cards)

+LP20 Stereo Loudness Processor (for Compass® Cards)

+2LP20 Dual Stereo Loudness Processor (for Compass® Cards)

Note: If a +LP license is added to a card equipped with other DSP-based audio options (such as +UM Audio Upmixer Option), the card can support all of these options, however these options cannot be simultaneously enabled (the card drop-down selector will automatically limit choices to valid combinations).

The card hardware must be of sufficiently recent build (cards built within the last 3 years) as to be equipped with two DSPs (as shown in DashBoard Card Info > DSP field displaying "DSP Count: 2").

Host cards with framesync can provide for advancing the audio timing by 8 msec to compensate for processing delay added by loudness processing. However, on cards without framesync this 8-msec audio lag will be present in the output SDI video signal. (However, various trials have demonstrated that lip-sync issues only become apparent to viewers when exceeded by one frame (typically >32 msec)).

+LP51A, +LP51B (2) 5.1 Loudness Processors (for Fusion3G® Cards)

+LP20A, +LP20B, +LP20C, +LP20D (4) Stereo Loudness Processors (for Fusion3G® Cards)

Note: On Fusion3G®, +LP can be combined and simultaneously used with other audio DSP options such as +UM. See product page or datasheet for more information.



AUDIO UPMIXING

Software Option

Featuring Linear Acoustic® UPMAX™ technology, the Audio Upmixing Software Option upmixes any stereo source received by a card to full 5.1-channel audio (L, R, C, LFE, Ls, Rs), thereby affording legacy stereo programming the full benefit of 5.1 channel environments.

The 5.1 upmixer can always generate a 5.1 feed from a stereo pair, or be set to look at signal levels on designated channels. Where valid 5.1 audio is present, the 5.1 upmixer allows the channels to pass unaffected. Where 5.1 audio is not

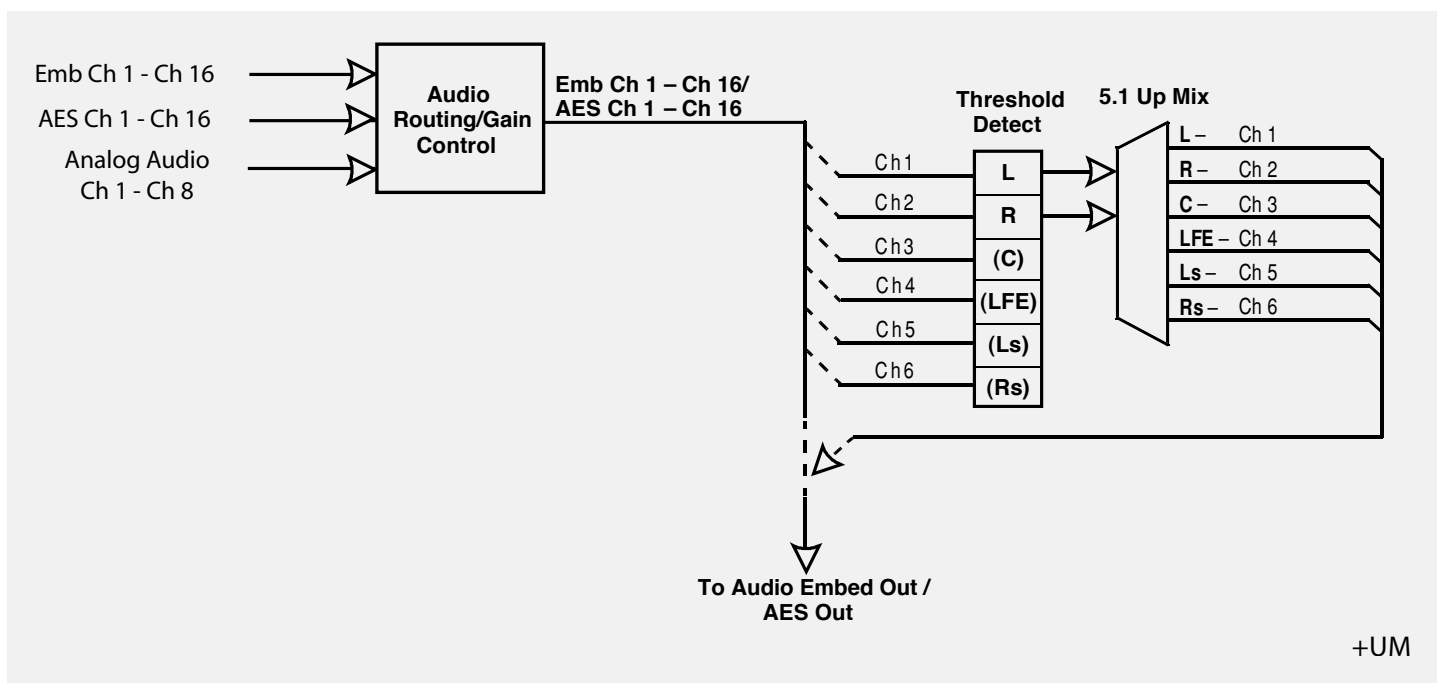
present, the 5.1 upmixer then automatically generates and routes the 5.1 audio on the designated channels.

Audio upmixing is available as an option on the Fusion3G® 9900 series, and select 9000 series cards. The software can be ordered with card purchase, or activated later using a downloadable feature key via free DashBoard™ remote control/monitoring software (no need to remove or replace card.)

FEATURES

Handles any type of stereo pair accommodated by the card

Configurable thresholds to tailor seamless automatic operation



ORDERING INFORMATION

+UM Optional Linear Acoustic® Audio Upmixer (Available on Fusion3G® 9900 Series cards, and select COMPASS® 9000 Series cards. Check specific catalog pages for option availability.)



AUDIO MIXING

Software Option

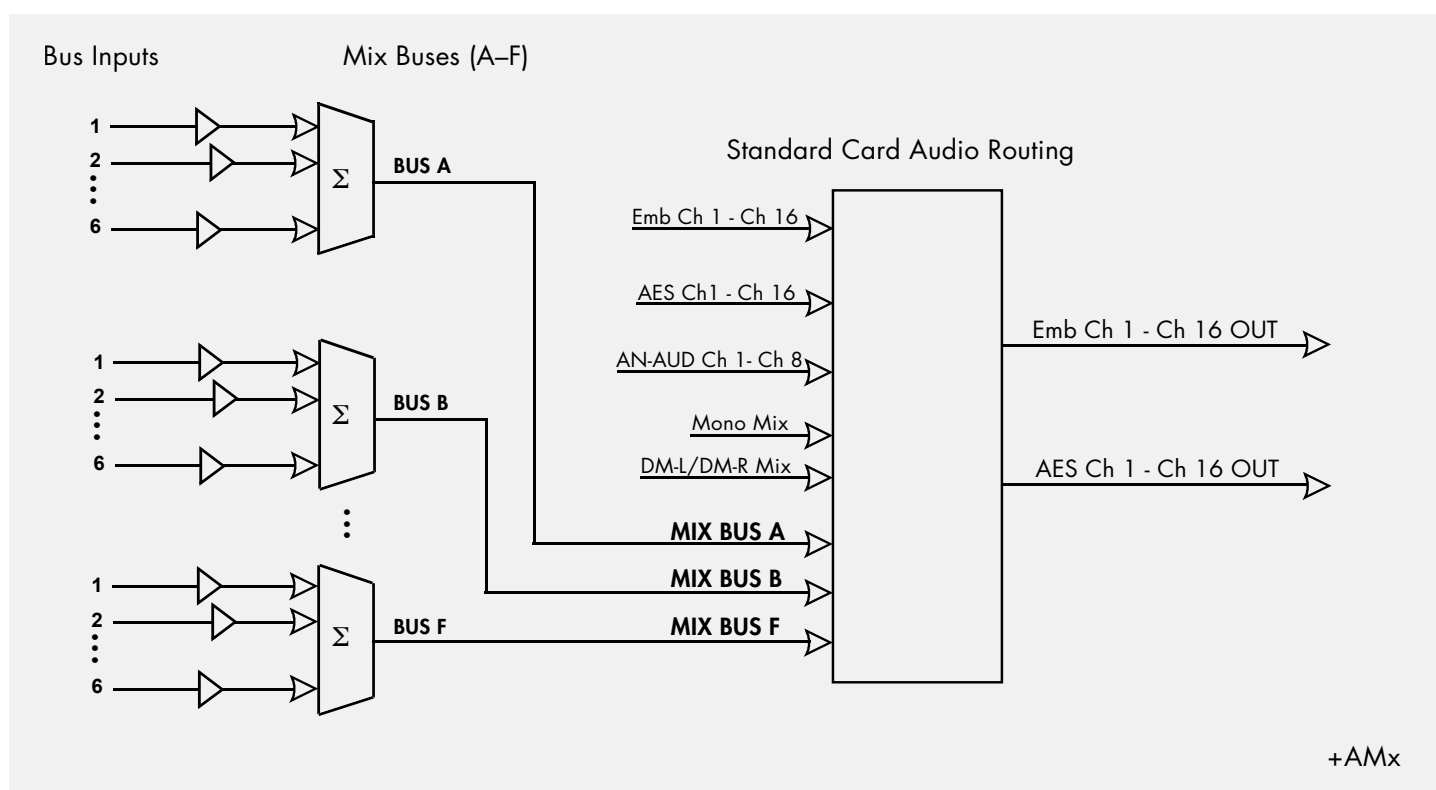
The Audio Mixing Software Option provides six, 6-input mono mixers which can be routed on the card just as any other audio source. Each mixer input channel can be sourced from any of the audio types handled by a particular card (e.g., AES, embedded, analog, or Dolby® decoded channels where available) and mixed into six groups that in turn can be directed to any AES or embedded output channel.

The Audio Mixing option operates on select 9000 series cards, and is a standard feature on Fusion3G® 9900 series cards. The software can be ordered with card purchase, or activated later using a downloadable feature key via free DashBoard™ remote control/monitoring software (no need to remove or replace card.)

FEATURES

Handles any combination of signals accommodated by the card

Independent DashBoard™ gain, phase and muting controls for each channel



ORDERING INFORMATION

+AMx Optional Audio Mixing (Standard on Fusion3G® 9900 Series cards. Available on select COMPASS® 9000 Series cards. Check specific catalog pages for option availability.)

AUDIO LTC » SOFTWARE OPTION



The Audio LTC option allows bidirectional transfer and conversion between video timecode formats and audio/RS-485 LTC. Audio LTC can be received over a selected balanced analog audio, embedded or AES input channel. Audio LTC can similarly be sent as digital audio over a selected embedded or AES output channel. RS-485 LTC can be received or sent via an RS-485 port (when card slot is correspondingly fitted with a Rear Module that accommodates RS-485).

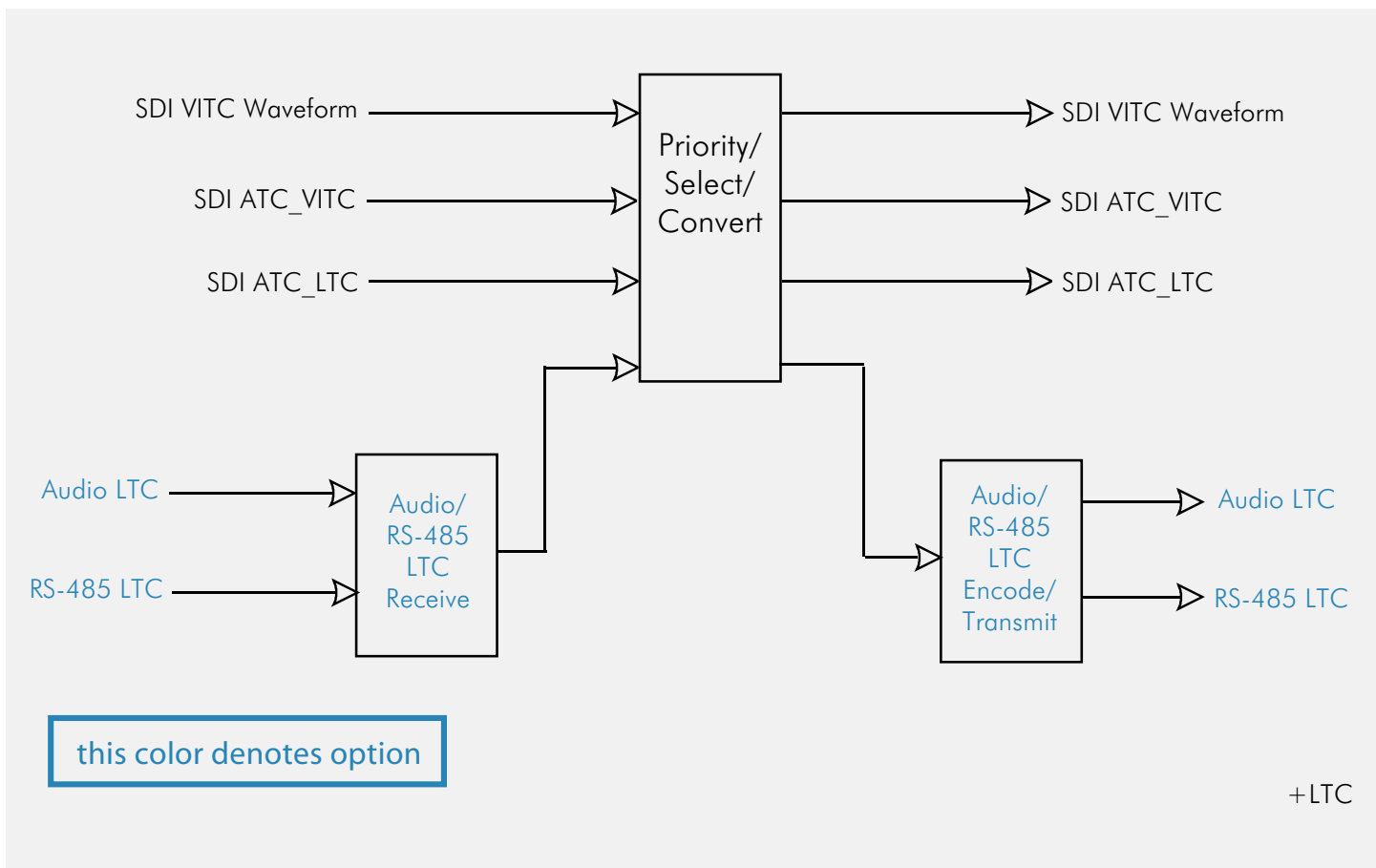
Cards with the +LTC option can monitor video streams, RS-485 and/or selected audio channels for supported timecode formats and then select and prioritize among VBI timecode formats and audio/RS-485 LTC. Any format received by the card can be outputted as audio or RS-485 LTC.

» FEATURES

Allows full timecode compatibility between contemporary and legacy systems such as tape decks

Seamless operation using the card standard timecode selection priority and output controls

Selectable "mute" control allows for automatic muting of audio LTC if selected input format is not available.



» ORDERING INFORMATION

+LTC Optional LTC RS-485/Audio Input/Output (Available on Fusion3G® and select 9000-series COMPASS® cards)





BBG-1000 SERIES

DESKTOP STAND-ALONE SYSTEMS

LOW POWER/HIGH-DENSITY DESIGN

COMPACT FOOTPRINT – UP TO 3 UNITS IN A 1RU SPACE

OPTIONAL TRAY PROVIDES SECURE CAPTIVE-FASTENER MOUNTING OF 3 UNITS IN A 1RU TRAY

WEB-BASED USER INTERFACE/REMOTE CONTROL AS WELL AS FRONT-PANEL PUSHBUTTON MENU-BASED LOCAL CONTROL WITH LCD STATUS/NET ID

FIVE YEAR WARRANTY



BBG-1002-DC-4K » MODULAR UHDTV QUADRANT COMBINING DOWNCONVERTER



New for 2014, the BBG-1002-DC-4K Modular UHDTV Quadrant Combining Downconverter provides an easily integrated modular standalone solution for converting 4K quadrant-division content into 3G/HD/SD-SDI. Easy to use DashBoard configuration and monitor provides for easy setup.

The BBG-1002-DC-4K precisely combines the four quadrant-divided individual SDI feeds into a combined SDI image directly suitable for broadcast production usage or monitoring purposes. The combined SDI output can be scaled to 3G/HD/SD-SDI. An HDMI output is also furnished which is directly usable by a monitor.

The compact 1/3-rack size of the BBG-1002-DC-4K allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring. DashBoard™ remote control allows easy centralized control and monitoring access.

» FEATURES

Scalable solution for 4K UHDTV quadrant-division down-conversion/integration to SDI for cinema and sports production

Input crosspoint allows quadrant inputs to be easily re-arranged without changing connections

Flexible downconvert output provides 3G/HD/SD-SDI output

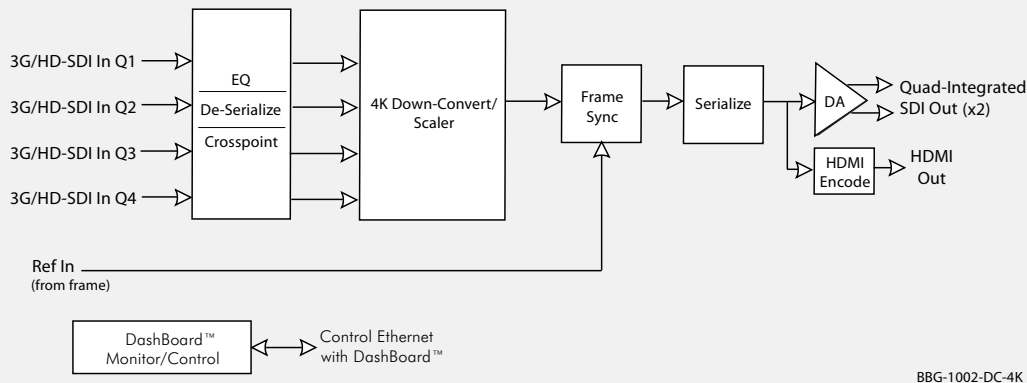
Redundant power supply option

Compact footprint - up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

HDMI output allows direct feed to monitors

DashBoard™ remote control status monitoring and setup/control

Five year warranty

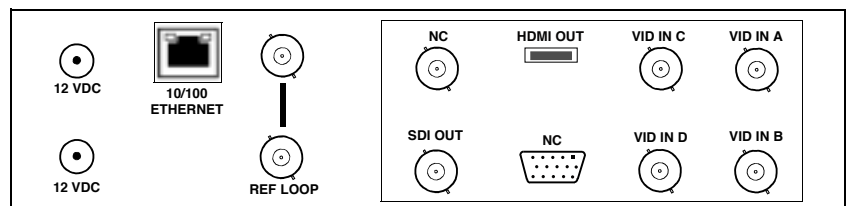


» SPECIFICATIONS

- Power**
< 18 Watts. Power supplied by 12VDC AC adapter, universal input.
- Video Input/Outputs**
Video Inputs: (4) 3G/HD/SD-SDI 75Ω BNC
SDI Output: (1) 3G/HD/SD-SDI 75Ω BNC
HDMI Output: (1) HDMI output
- Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
- Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
- Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
- Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

» ORDERING INFORMATION

- BBG-1002-DC-4K** Modular Quadrant Division Multiplexer/Downconverter
- BBG-1000-PS** Redundant Power Supply Module
- BBG-1000-TRAY** 1RU Mounting Tray (supports 3 units)



BBG-1003-UDX-ADDA » 3G/HD/SD-SDI MODULAR UNIVERSAL FORMAT CONVERTER

with CVBS/YpPr Video I/O. Up/Down/Cross Conversion, Framesync, AES and Analog Audio Embedding/De-Embedding



The all-new Cobalt® BBG-1003-UDX-ADDA 3G/HD/SD-SDI Modular Universal Format Converter with CVBS/YpPr Video I/O, Up/Down/Cross Conversion, Framesync, AES and Analog Audio Embedding / De-Embedding provides a high-density modular standalone solution that offers unprecedented multi-input support, flexibility, and ease of use and integration for SDI and analog video and discrete audio. Frame sync provides glitch-free audio upon framesync events, with video/audio offsets user configurable. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair.

With option +ANC, the BBG-1003-UDX-ADDA offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams. The easy to use interface allows direct access to DID and SDID locations to extract or insert user data such as camera PTZ, SCTE 104, closed-captioning read/insert, GPI/GPO via ANC, or other specialized user payloads. Data can be extracted and inserted within the unit, bypassing the scaler (Bridge mode), or inserted and/or extracted to and from external interface via serial or IP interfaces.

Multiple SDI input ports allow selection from multiple input sources with clean switching performed on the RP168 switch line. Both CVBS and component analog video is supported both as inputs and outputs.

The up/down/cross convert scaler is specifically designed for broadcast video formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

Preset save/load allows saving custom settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. The BBG-1003-UDX-ADDA uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1002-UDX allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring.

FEATURES

Multi-input, with SDI RP168 switch line clean switching

Universal I/O support - analog CVBS and component inputs and outputs, as well as analog and AES audio embed/de-embed. 10-bit processing with 5-line adaptive comb filtered SD Y/C separation.

Framesync with full H/V offset and manual/LOS video pattern generator

Up/Down/Cross Conversion and ARC specifically tailored for broadcast video

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

Option +ANC adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads. Multi-mode setup includes Bridge mode (device internal path with scaler bypass bridging) or Insert/Extract modes for insert/extract to or from IP/serial external interfaces.

Available color correction option

Low-power/high-density design - less than 13 Watts

Compact footprint - up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID

Five year warranty

OPTIONS

Audio LTC I/O (+LTC)

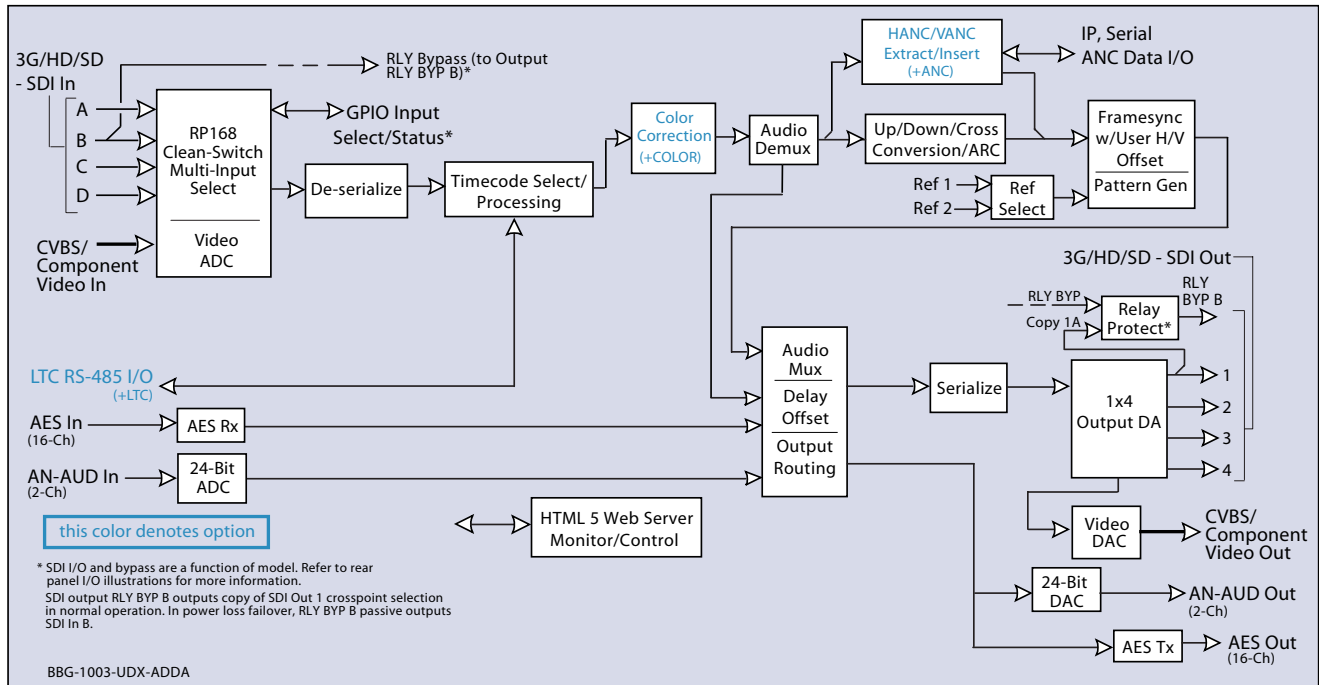
Ancillary Data Processor (+ANC). Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces. Bridge mode can be set to preserve special/custom ANC packages when scaler is enabled.

Color Correction (+COLOR)

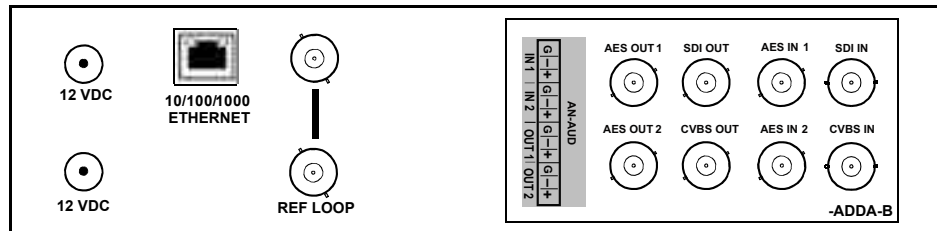
1RU Mounting Tray (supports 3 units) (BBG-1000-TRAY)

Redundant Power Supply Module (BBG-1000-PS)

BBG-1003-UDX-ADDA

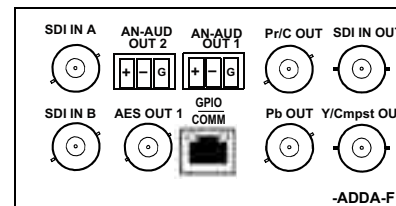
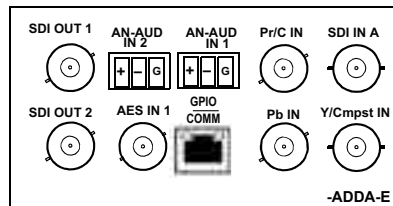
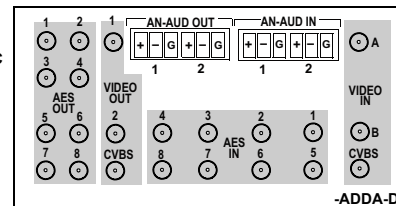


Rear Panel



Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

-D model available as -DIN (DIN 1.0/2.3 connectors) or -HDBNC (HD-BNC connectors)



BBG-1003-UDX-ADDA

SPECIFICATIONS

Power

< 13 Watts. Power supplied by 12VDC AC adapter, universal input (included).

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Analog Video Input/Outputs

(1) 75Ω BNC CVBS input

(1) 75Ω BNC CVBS output. CVBS can be upscaled to any supported SDI format; all SDI formats can be downconverted to CVBS.

75Ω BNC Component Video inputs (Y, Cb, Cr)

75Ω BNC Component Video outputs (Y, Cb, Cr)

ADC resolution: 10-bit

Sampling frequency: 54 MHz (4x over-sampling SD)

SD Y/C separation: 5 line Adaptive Comb Filter

SD Freq. Response: ± 0.25 dB to 5.5 MHz

SD SNR: > 55 dB to 5.5 MHz (unweighted)

Differential Phase: < 1 degree

Differential Gain: < 1%

Nonlinearity < 1%

HD Freq. Response: Y 30 MHz., PbPr 15 MHz

HD SNR: > 55 dB to 30 MHz (unweighted)

Discrete Audio Input/Outputs

(8) AES-3id 75Ω BNC input

(8) AES-3id 75Ω BNC output

(2) Balanced analog audio inputs

(2) Balanced analog audio outputs

I/O conforms to 0 dBFS = +24 dBu

Analog Input Impedance: >10 kΩ

Analog Reference Level: -20 dBFS

Analog Nominal Level: +4 dBu

Analog Input Clip Level: +24 dBu (0 dBFS)

Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

Analog SNR: 115 dB (A weighted)

Analog THD+N: -96 dB (20 Hz to 10 kHz)

Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Frame Reference Input

Looping 2-BNC connection. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level"

Return Loss: >35 dB up to 5.75 MHz

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.

Weight: 6 lb (2.8 kg)

BBG-1003-UDX-ADDA

ORDERING INFORMATION

BBG-1003-UDX-ADDA 3G/HD/SD-SDI Modular Universal Format Converter with CVBS/YPbPr Video I/O, Up/Down/Cross Conversion, Framesync, AES and Analog Audio Embedding / De-Embedding

BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

BBG-1003-UDX-ADDA-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Input BNCs, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SD-SDI Output BNCs, Component/CVBS Video Out BNC, (2) Balanced Analog Audio Outputs

BBG-1003-UDX-ADDA-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

BBG-1003-UDX-ADDA-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

BBG-1003-UDX-ADDA-E 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNCs, Component/CVBS Video In BNCs, (1) AES In BNC, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Output BNCs, (1) GPIO/COMM RJ-45 connector

BBG-1003-UDX-ADDA-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, Component/CVBS Video Out BNCs, (1) AES Out BNC, (2) Balanced Analog Audio Outputs, (1) 3G/HD/SD-SDI Output BNC, (1) GPIO/COMM RJ-45 connector

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+ANC Ancillary Data Processor

BBG-1022-2FS » 3G/HD/SD-SDI MODULAR DUAL-CHANNEL FRAMESYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O



The all-new Cobalt® BBG-1022-2FS 3G/HD/SD-SDI Modular Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O offers *two independent signal paths of framesync / audio embedding and de-embedding in a single unit.*

Advanced framesync features include per-channel audio delay, audio/video offset, and output rate conversion to and from 23.98/29.97/29.94 to 24/30/60 frame rates. Frame sync can select from multiple reference inputs, with failover to alternate selected sources. Each path can independently use either of two frame references or internal reference.

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair. Bulk and per-channel audio delay controls easily address lip-sync issues.

A convenient input crosspoint with RP168 clean switching can select from up to four SDI inputs to be applied to either of the unit's two processing paths. The input crosspoint allows manual selection of input via remote control or GPIO, or failover

to alternate inputs on loss of input conditions. For each path, two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Moving-box insertion can be enabled to serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

Preset save/load allows saving custom settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. The BBG-1022-2FS uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1022-2FS allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring.

FEATURES

Two independent processing paths per card – 20 channels of processing in only 10 slots

Multi-input RP168 clean switch, with manual selection or GPI controlled input selection

Closed-captioning absence detection

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides alert actions on criteria such as black/frozen frame, audio silence, and closed-captioning absence. Threshold and hold-off are user configurable.

Moving-box insertion serves as a dynamic raster confidence check even in cases where the input video image is static

Framesync with full H/V offset and manual/LOS video pattern generator

Per-path dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

CVBS analog video I/O and analog/AES embed / de-embed with 4-line Adaptive Comb Filter

Video options include color correction and keying

Pattern generator for each channel can provide raster/test pattern and patterns for LOS failover insertion

Low-power/high-density design – less than 18 Watts

Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID

Five year warranty

OPTIONS

Quality Check (+QC). Provides failover on criteria such as black/frozen frame, audio silence, and CC absence.

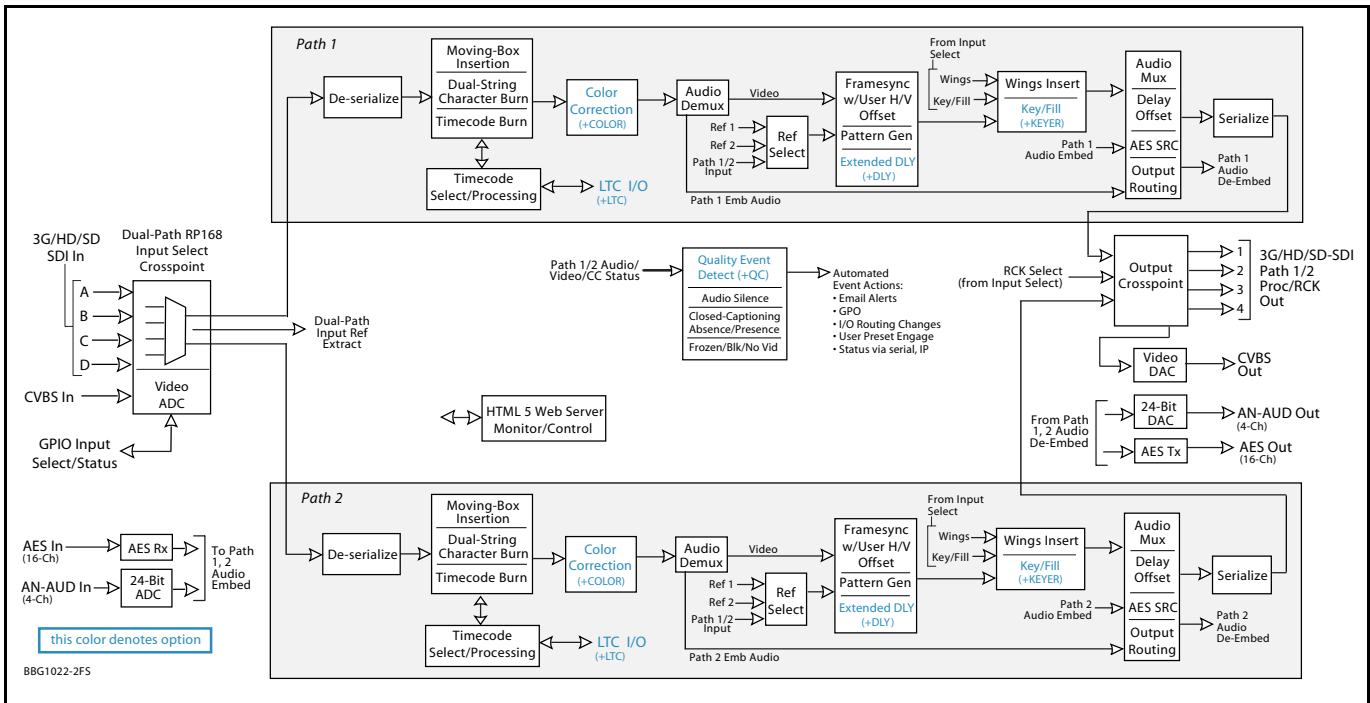
Key/Fill Keyer (+KEYER). Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

Color Correction (+COLOR). Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

Expanded Delay (+DLY). Allows framesync frame delay up to 390 frames.

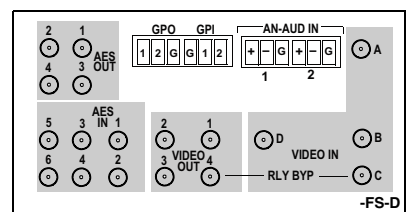
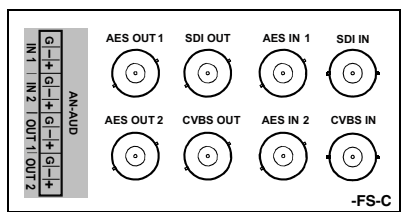
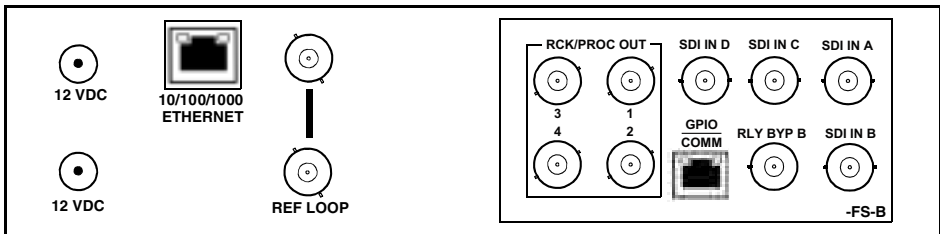
Audio LTC I/O (+LTC)

BBG-1022-2FS



Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

Rear Panel



BBG-1022-2FS

SPECIFICATIONS

Power

< 18 Watts. Power supplied by 12VDC AC adapter, universal input (included).

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs (selectable as processed SDI Path 1 or Path 2, or selected input reclocked)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input

(1) 75Ω BNC output (selectable as Path 1 or Path 2 processed output). CVBS output functional only when selected path is carrying SD-SDI.

ADC resolution: 9-bit

Sampling frequency: 27 MHz (2x over-sampling)

Y/C separation: 4 line Adaptive Comb Filter

Freq. Response: ± 0.25 dB to 5.5 MHz

SNR: > 50 dB to 5.5 MHz (unweighted)

Differential Phase: < 1 degree

Differential Gain: < 1%

Nonlinearity < 1%

Discrete Audio Input/Outputs

AES-3id 75? inputs (8 pair (16-Ch) max) AES-3id 75? outputs (8 pair (16-Ch) max)

Input AES SRC Range: 32 to 96 kHz

Balanced analog audio inputs (4-Ch max)

Balanced analog audio outputs (4-Ch max)

(I/O conforms to 0 dBFS = +24 dBu)

Analog Output Impedance: < 50 Ω

Analog Reference Level: -20 dBFS

Analog Nominal Level: +4 dBu

Analog Max Output Level: +24 dBu (0 dBFS)

Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)

Analog SNR: 115 dB (A weighted)

Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)

Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Framesync Audio/Video Delay

Standard max offset: 20 frames

Option +DLY max offset: 390 frames (1077 ms / 2161 ms / 11500 ms (3G / HD / SD))

Latency (min): 1 frame

Text Burn-In

(2) independent strings per path supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Frame Reference Input

Looping 2-BNC connection. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level"

Return Loss: >35 dB up to 5.75 MHz

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.

Weight: 6 lb (2.8 kg)

BBG-1022-2FS

ORDERING INFORMATION

BBG-1022-2FS-B 3G/HD/SD-SDI Modular Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O. (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), (1) GPIO/COMM RJ-45 connector

BBG-1022-2FS-C 3G/HD/SD-SDI Modular Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O. (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video In BNC, (2) AES In BNCs, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SDI Output BNC, (1) CVBS Video Out BNC, (2) AES Out BNCs, (2) Balanced Analog Audio Outputs

BBG-1022-2FS-D-DIN 3G/HD/SD-SDI Modular Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O. (4) 3G/HD/SD-SDI Inputs, (2) GPI, (2) GPO, (2) Balanced Analog Audio In, (2) AES Inputs, (4) 3G/HD/SDI Outputs w/ relay protect C-3, (8) AES Outputs. All coaxial connectors DIN 1.0/2.3.

BBG-1022-2FS-D-HDBNC 3G/HD/SD-SDI Modular Dual-Channel Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O. (4) 3G/HD/SD-SDI Inputs, (2) GPI, (2) GPO, (2) Balanced Analog Audio In, (2) AES Inputs, (4) 3G/HD/SDI Outputs w/ relay protect C-3, (8) AES Outputs. All coaxial connectors HD-BNC.

BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

+DLY Extended Delay Option

+QC Quality Check Option

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

BBG-1022-FS » 3G/HD/SD-SDI MODULAR FRAMESYNC

with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS)



The all-new Cobalt® BBG-1022-FS 3G/HD/SD-SDI Modular Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding and CVBS I/O offers frame sync, and advanced audio and ancillary data support, plus many other powerful features. Frame sync can select from multiple reference inputs, with failover to alternate selected sources. Full audio support includes per-channel audio delay. With software upgrade option+2FS, a second independent processing path can be added, offering two independent signal paths of framesync / audio embedding and de-embedding on a single unit.

Advanced framesync features include per-channel audio delay, audio/video offset, and output rate conversion to and from 23.98/29.97/29.94 to 24/30/60 frame rates. Frame sync can select from multiple reference inputs, with failover to alternate selected sources. Each path can independently use either of two frame references or internal reference. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair. Bulk and per-channel audio delay controls easily address lip-sync issues.

A convenient input crosspoint with RP168 clean switching can select from up to four SDI inputs. The input crosspoint allows manual selection of input via remote control or GPIO, or failover to alternate inputs on loss of input conditions. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

Preset save/load allows saving custom settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. The BBG-1022-FS uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1022-FS allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring.

FEATURES

Multi-input RP168 clean switch, with manual selection or GPI controlled input selection

Closed-captioning absence detection

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides alert actions on criteria such as black/frozen frame, audio silence, and closed-captioning absence. Threshold and hold-off are user configurable.

Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static

Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Framesync with full H/V offset and manual/LOS video pattern generator

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

CVBS analog video I/O and analog/AES embed / de-embed available

Pattern generator can provide raster/test pattern and patterns for LOS failover insertion

Video options include color correction and keying

Low-power/high-density design - less than 18 Watts

Compact footprint - up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID

Five year warranty

OPTIONS

Dual-Channel Option (+2FS). Adds a second independent processing path, offering two independent signal paths of framesync / audio embedding and de-embedding on a single unit. (Upgrades device to full BBG-1022-2FS functionality and specifications.)

Quality Check (+QC). Provides failover on criteria such as black/frozen frame, audio silence, and CC absence.

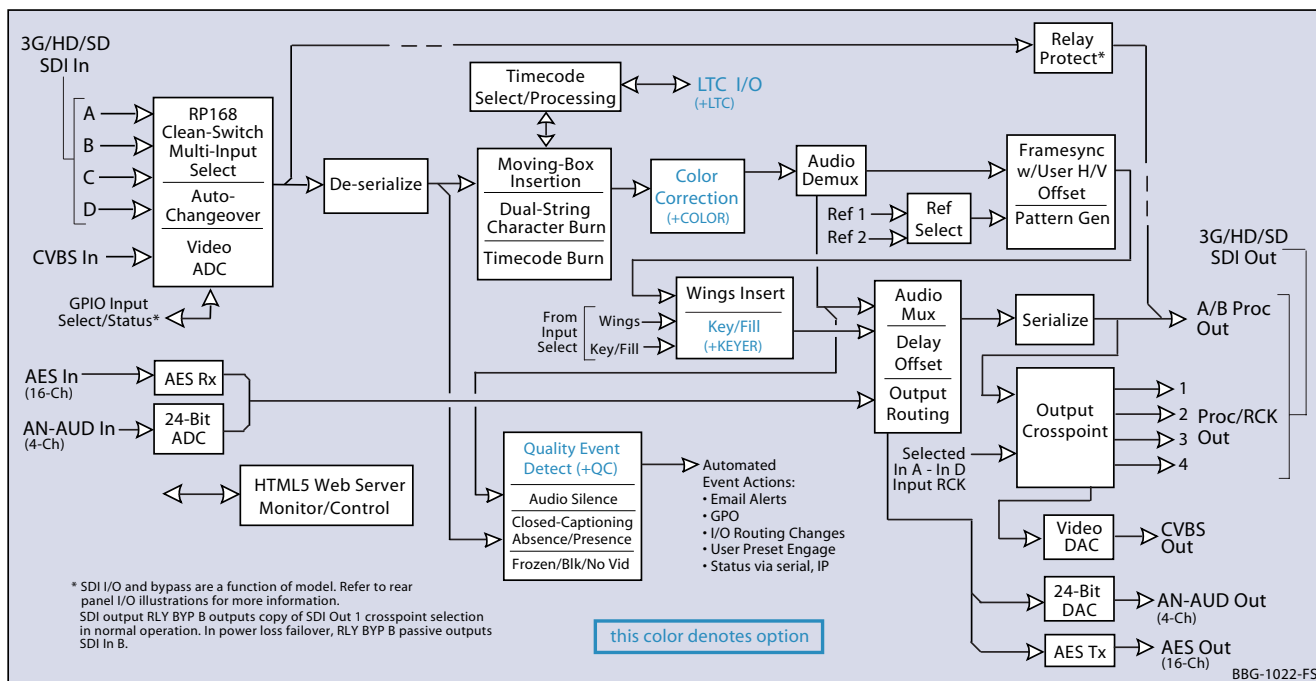
Expanded Delay (+DLY). Allows framesync frame delay up to 390 frames.

Key/Fill Keyer (+KEYER). Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

Audio LTC I/O (+LTC)

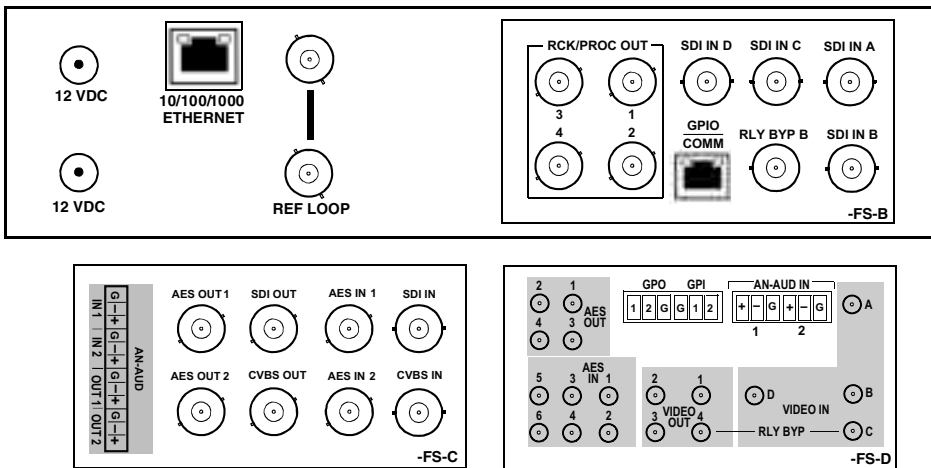
Color Correction (+COLOR). Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

BBG-1022-FS



Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

Rear Panel



BBG-1022-FS

)) SPECIFICATIONS

Power

< 18 Watts. Power supplied by 12VDC AC adapter, universal input (included).

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
 Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
 SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
 SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
 SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
 SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
 Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input
 (1) 75Ω BNC output (selectable as Path 1 or Path 2 processed output). CVBS output functional only when selected path is carrying SD-SDI.
 ADC resolution: 9-bit
 Sampling frequency: 27 MHz (2x over-sampling)
 Y/C separation: 4 line Adaptive Comb Filter
 Freq. Response: ± 0.25 dB to 5.5 MHz
 SNR: > 50 dB to 5.5 MHz (unweighted)
 Differential Phase: < 1 degree
 Differential Gain: < 1%
 Nonlinearity < 1%

Discrete Audio Input/Outputs

AES-3id 75? inputs (8 pair (16-Ch) max) AES-3id 75? outputs (8 pair (16-Ch) max)
 Input AES SRC Range: 32 to 96 kHz
 Balanced analog audio inputs (4-Ch max)
 Balanced analog audio outputs (4-Ch max)
 (I/O conforms to 0 dBFS = +24 dBu)
 Analog Output Impedance: < 50 Ω
 Analog Reference Level: -20 dBFS
 Analog Nominal Level: +4 dBu
 Analog Max Output Level: +24 dBu (0 dBFS)
 Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
 Analog SNR: 115 dB (A weighted)
 Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)
 Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Framesync Audio/Video Delay

Standard max offset: 20 frames
 Option +DLY max offset: 390 frames (1077 ms / 2161 ms / 11500 ms (3G / HD / SD)
 Latency (min): 1 frame

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Frame Reference Input

Looping 2-BNC connection. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level"
 Return Loss: >35 dB up to 5.75 MHz

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.
 Weight: 6 lb (2.8 kg)

BBG-1022-FS

ORDERING INFORMATION

BBG-1022-FS-B 3G/HD/SD-SDI Modular Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS). (4) 3G/HD/SD-SDI Input BNCs, (4) 3G/HD/SD-SDI Output BNCs, (1) 3G/HD/SDI Output BNC (with relay bypass failover), (1) GPIO/COMM RJ-45 connector

BBG-1022-FS-C 3G/HD/SD-SDI Modular Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS). (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video In BNC, (2) AES In BNCs, (2) Balanced Analog Audio Inputs, (1) 3G/HD/SDI Output BNC, (1) CVBS Video Out BNC, (2) AES Out BNCs, (2) Balanced Analog Audio Outputs

BBG-1022-FS-D-DIN 3G/HD/SD-SDI Modular Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS). (4) 3G/HD/SD-SDI Inputs, (2) GPI, (2) GPO, (2) Balanced Analog Audio In, (2) AES Inputs, (4) 3G/HD/SDI Outputs w/ relay protect C-3, (8) AES Outputs. All coaxial connectors DIN 1.0/2.3.

BBG-1022-FS-D-HDBNC 3G/HD/SD-SDI Modular Framesync with Audio/Video Processing, AES/Analog Audio Embedding/De-Embedding, CVBS I/O, and Dual-Channel Option (+2FS). (4) 3G/HD/SD-SDI Inputs, (2) GPI, (2) GPO, (2) Balanced Analog Audio In, (2) AES Inputs, (4) 3G/HD/SDI Outputs w/ relay protect C-3, (8) AES Outputs. All coaxial connectors HD-BNC.

BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

+2FS Add Dual-Channel Option

+DLY Extended Delay Option

+QC Quality Check Option

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

BBG-1032-EMDE » 3G/HD/SD-SDI MODULAR 16-PAIR (32-CHANNEL) EMBEDDER/DE-EMBEDDER with Audio/Video Processing and CVBS I/O



The all-new Cobalt® BBG-1032-EMDE 3G/HD/SD-SDI Modular 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O provides a full-feature embedder/de-embedder with up to 32 channels of simultaneous AES embedding/de-embedding. The BBG-1032-EMDE is available with numerous options that expand its function well beyond embed/de-embed to maximize frame processing density and system economy.

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with program video 48 kHz timing for glitch-free embedding. Individual, per-pair SRC auto-detects and disables SRC when a Dolby pair is detected on an input pair. Bulk and per-channel audio delay controls easily address lip-sync issues.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. Quality Check option +QC allows failover to alternate inputs based on user-configurable criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS marker. A moving-box insertion can be enabled

to serve as a dynamic raster confidence check even when the input video image is static. Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected.

Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video. The BBG-1032-EMDE also provides analog CVBS video inputs and outputs, and analog audio embedding and de-embedding. With option +ANC, the BBG-1032-EMDE offers full VANC/HANC ancillary data packet de-embedding and embedding for 3G/HD/SD-SDI streams.

Preset save/load allows saving custom settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. The BBG-1032-EMDE uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1032-EMDE allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring.

FEATURES

Multi-input, with manual selection or intelligent Auto-Changeover failover

Closed-captioning absence detection and flagging, with GPO, automated alert email, go-to user preset, or other actions

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides failover on criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

Moving-box/ motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static

Advanced audio processing allows routing, gain, delay, and flexible mixing as standard features

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

CVBS analog video I/O and analog/AES embed / de-embed available

Option +ANC adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads.

Video options include color correction and keying

Low-power/high-density design – less than 18 Watts

Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID

Five year warranty

OPTIONS

Quality Check (+QC). Provides failover on subjective criteria such as black/frozen frame or audio silence.

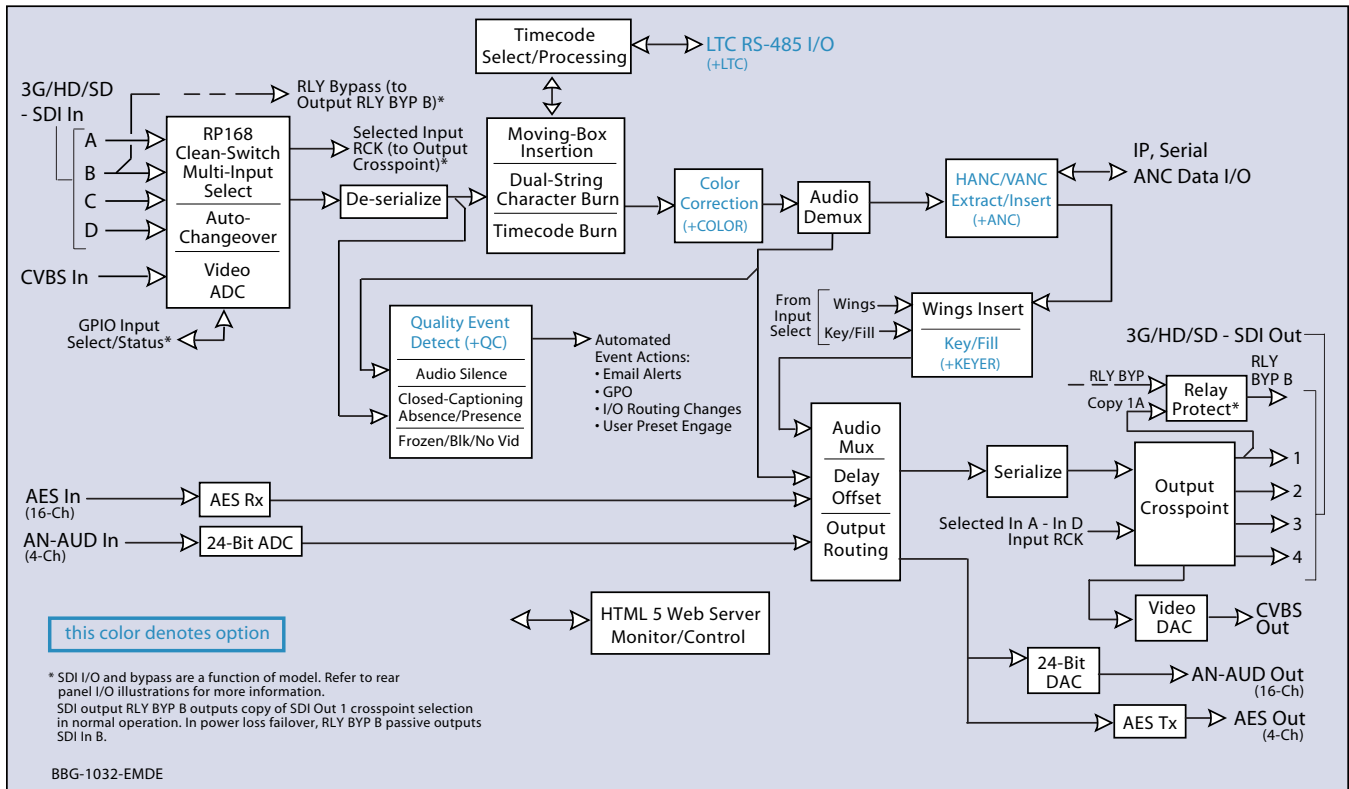
Key/Fill Keyer (+KEYER). Provides keying using independent SDI inputs for key and fill signals. A separate preview SDI output is provided for observing key results before applying to program video output. Alpha Threshold mode allows full-color key/fill using low-cost PC-based graphics host where the same signal provides a shared key/fill input.

Audio LTC I/O (+LTC)

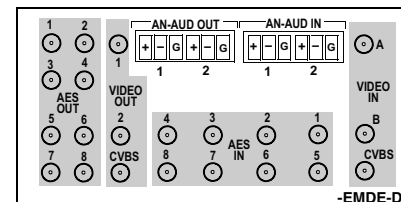
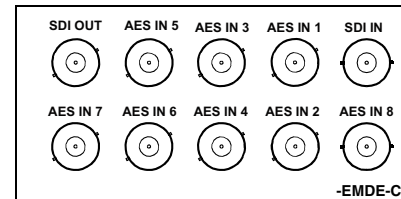
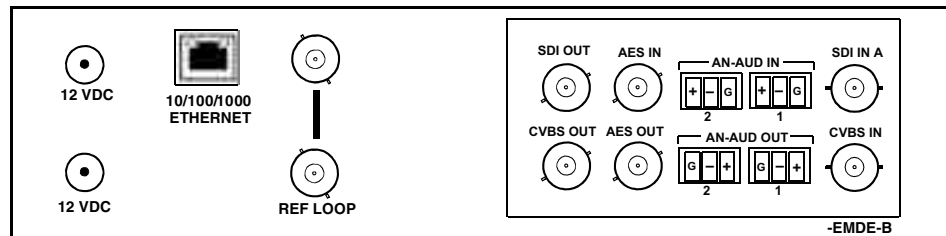
Color Correction (+COLOR). Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

Ancillary Data Processor (+ANC). Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP, RS-232/RS-422 serial, and GPIO external interfaces.

BBG-1032-EMDE



Rear Panel



Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

BBG-1032-EMDE**SPECIFICATIONS****Power**

< 18 Watts. Power supplied by 12VDC AC adapter, universal input (included).

SDI Input/Outputs

Up to (4) 75Ω BNC inputs
 Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
 SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
 SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
 SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
 SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
 Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
 Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs

(1) 75Ω BNC input
 (1) 75Ω BNC output. CVBS output functional only when selected processed signal is carrying SD-SDI.
 ADC resolution: 9-bit
 Sampling frequency: 27 MHz (2x over-sampling)
 Y/C separation: 4 line Adaptive Comb Filter
 Freq. Response: ± 0.25 dB to 5.5 MHz
 SNR: > 50 dB to 5.5 MHz (unweighted)
 Differential Phase: < 1 degree
 Differential Gain: < 1%
 Nonlinearity < 1%

Discrete Audio Input/Outputs

AES-3id 75? inputs (8 pair (16-Ch) max) AES-3id 75? outputs (8 pair (16-Ch) max)
 Input AES SRC Range: 32 to 96 kHz
 Balanced analog audio inputs (4-Ch max)
 Balanced analog audio outputs (4-Ch max)
 (I/O conforms to 0 dBFS = +24 dBu)
 Analog Output Impedance: < 50 Ω
 Analog Reference Level: -20 dBFS
 Analog Nominal Level: +4 dBu
 Analog Max Output Level: +24 dBu (0 dBFS)
 Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
 Analog SNR: 115 dB (A weighted)
 Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)
 Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-in

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.
 Weight: 6 lb (2.8 kg)

BBG-1032-EMDE**ORDERING INFORMATION**

BBG-1032-EMDE-B 3G/HD/SD-SDI Modular 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O. (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video Input BNC, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (1) AES Output BNC

BBG-1032-EMDE-C 3G/HD/SD-SDI Modular 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O. (1) 3G/HD/SD-SDI Input BNC, (8) AES Input BNCs, (1) 3G/HD/SD-SDI Output BNC

BBG-1032-EMDE-D-DIN 3G/HD/SD-SDI Modular 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O. (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

BBG-1032-EMDE-D-HDBNC 3G/HD/SD-SDI Modular 16-Pair (32-Channel) Embedder / De-Embedder with Audio/Video Processing and CVBS I/O. (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

+QC Quality Check Option

+LTC Audio LTC I/O Option

+COLOR Color Correction Option

+KEYER Key/Fill Keyer Option

+ANC Ancillary Data Processor

BBG-1040-ACO » DUAL-INPUT MODULAR FRAMESYNC

with Auto-Changeover and Character Burn



The all-new Cobalt® BBG-1040-ACO Dual-Input Modular Framesync with Auto-Changeover and Character Burn provides a high-density standalone modular unit that offers unprecedented multi-input support, flexibility, and ease of use and integration. Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions as well as user-configurable subjective criteria such as black/frozen frame or audio silence. Quality Check allows failover to alternate inputs based on user-configurable subjective criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS marker. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static.

Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

The BBG-1040-ACO uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1040-ACO allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring.

» FEATURES

Dual-input, with manual selection or intelligent Auto-Changeover failover. Latching relay bypass retains manual or failover input-to-output routing even in the event of power failure.

Auto-Changeover can be set to invoke failover for basic input loss as well as subjective failover based on black/frozen frame or audio silence. Threshold and hold-off are user configurable.

Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Moving-box/motion insertion enable serves as a dynamic raster confidence check even when the input video image is static

Supports import of user trouble slate graphic file for LOS failover insertion

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

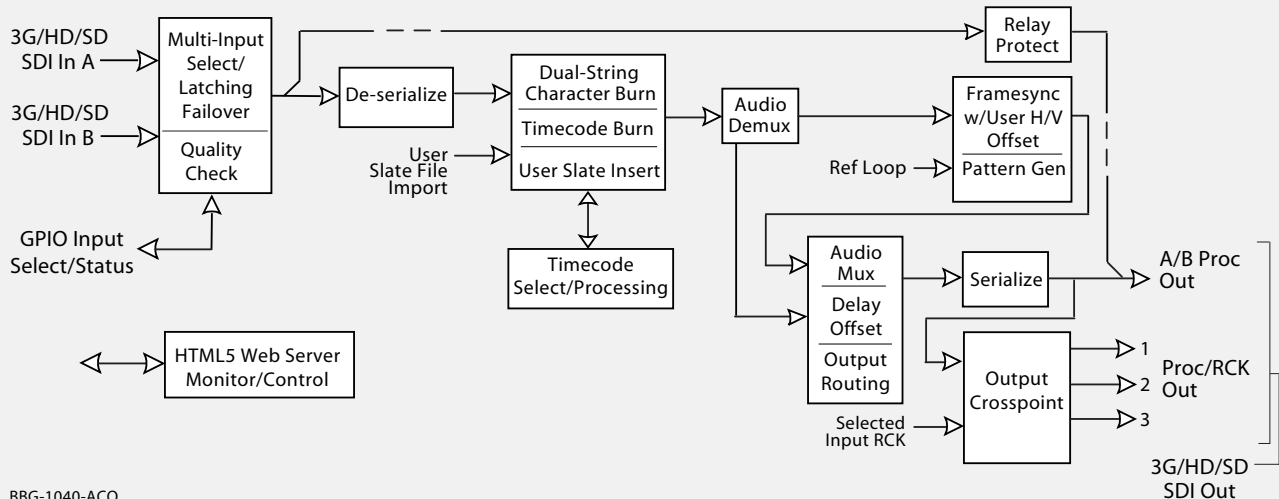
Framesync with full H/V offset and manual/LOS video pattern generator. Framesync can also convert raster format between 29.97/59.94 and 30/60 formats. Rear-panel looping reference connectors.

Full audio crosspoint with delay control available for all audio outputs.

Web-based user interface/remote control as well as front-panel LCD local control
Redundant power supply option

Compact footprint - up to 3 units in a 1RU space

Five-year warranty

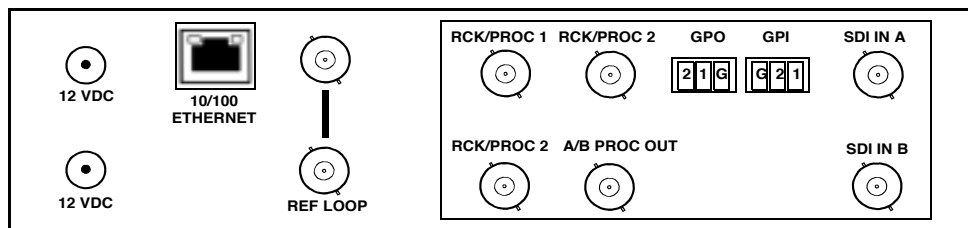


BBG-1040-ACO

BBG-1040-ACO

SPECIFICATIONS

<p>Power < 18 Watts. Power supplied by 12VDC AC adapter, universal input.</p>	<p>Input Select/Auto-Changeover Failover</p> <ul style="list-style-type: none"> - Manual selection (forced) of any input via web GUI/front panel controls or GPI. - Failover to alternate input on loss of target input. Failover invoked upon LOS or user configurable parametric criteria such as black/frozen frame or audio silence. - Black frame trigger configurable for black intensity threshold and persistence time. - Frozen frame trigger configurable for frozen percentage difference and persistence time. - Audio silence trigger configurable for dBFS floor threshold and persistence time. - Relay latching for manually or failover selected path retains routing in loss of power conditions. 	<p>Audio Output 16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Downmix output available for any output channel pair. Master delay control; range of -33 msec to +3000 msec.</p>
<p>Video Input/Outputs SDI inputs: (2) 75Ω BNC SDI outputs: (1) 75Ω A/B BNC w/ RLY Bypass Protect. (3) DA 75Ω BNC; selectable as selected-input RCK or processed. Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A) Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI</p>	<p>Text Burn-In (2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.</p>	<p>GPI/O (2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected.</p>
<p>Timecode Insertion/Burn-In Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.</p>	<p>Control/Monitor Interface HTML5 web server/interface via rear-panel 100/1000 Ethernet port.</p>	<p>Frame Reference Input Looping 2-BNC connection. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level" Return Loss: >35 dB up to 5.75 MHz</p>
		<p>Physical Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections. Weight: 6 lb (2.8 kg)</p>



Note: A/B PROC OUT is the card processed output which uses either input SDI IN A or SDI IN B. This output uses relay latching to retain selected routing in the event of power loss regardless of whether a selection was manually invoked or by a unit-detected failover (for example, if an auto-changeover from A to B was invoked while active, routing of input B to this output is retained in the event of power loss).

RCK/PROC 1 thru RCK/PROC 3 are DA outputs which can be individually set as relocked or processed outputs of the currently-selected input. These outputs are not relay-equipped and will lose signal in the event of power loss.

ORDERING INFORMATION

BBG-1040-ACO Dual-Input Modular Framesync with Auto-Changeover and Character Burn

BBG-1000-PS Redundant (n+1) Power Supply Module

+LTC Audio LTC I/O Option

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

BBG-1040-4X1-CS » 3G/HQ/SD-SDI MODULAR 4X1 CLEAN AND QUIET BYPASS ROUTER

with Relay-Protected Input and GPIO Monitoring/Control



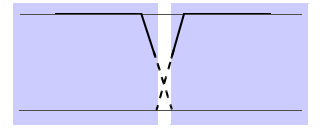
The all-new Cobalt® BBG-1040-4x1-CS 3G/HQ/SD-SDI Modular 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control provides Clean & Quiet routing in a high-density standalone solution. The Clean & Quiet routing not only provides switching on the RP168-specified VANC switch line, but also provides audio cross-fade upon switches to provide video switches free of switching artifacts, and provides dead-quiet audio between switches.

Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. Also Included standard is closed captioning absence/presence detection that allows CEA 608/708 and line 21 SD CC absence or presence to be detected. Option +QC provides user-configurable Video Quality Event intelligent assessments such as black/frozen frame or audio silence. Video Quality or Closed-Captioning event status can independently be propagated for each event type as GPO, automated alert email, input routing changes, or user presets you can configure to provide any number of special actions such as routing changes or burn-in text alert messages.

Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Any of several standard test patterns can be inserted as an input LOS marker. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even when the input video image is static. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

Preset save/load allows saving custom settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. The BBG-1040-4x1-CS uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1040-4x1-CS allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring.

Quiet Cross-Fade pulls audio to floor and gracefully reverts to normal level during input routing changes



FEATURES

Clean & Quiet Routing ensures program video switches free from video artifacts and audio clicks or pops

Multi-input, with manual selection or intelligent Auto-Changeover failover

Closed-captioning absence detection

Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides alert actions on criteria such as black/frozen frame, audio silence, and closed-captioning absence. Threshold and hold-off are user configurable.

Moving-box/motion insertion enable serves as a dynamic raster confidence check even in cases where the input video image is static

Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Input selection and status can be propagated via GPIO, serial, or IP interfaces

Video options include color correction

Low-power/high-density design – less than 18 Watts

Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID

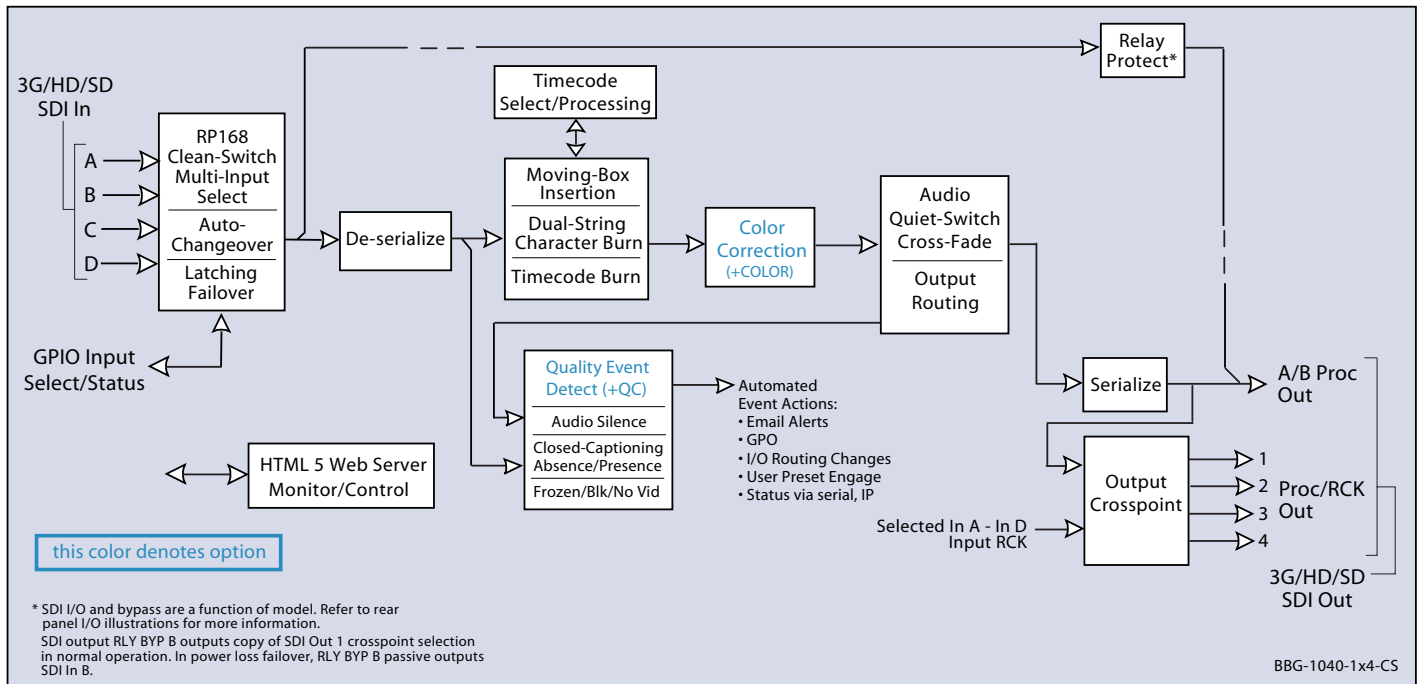
Five year warranty

OPTIONS

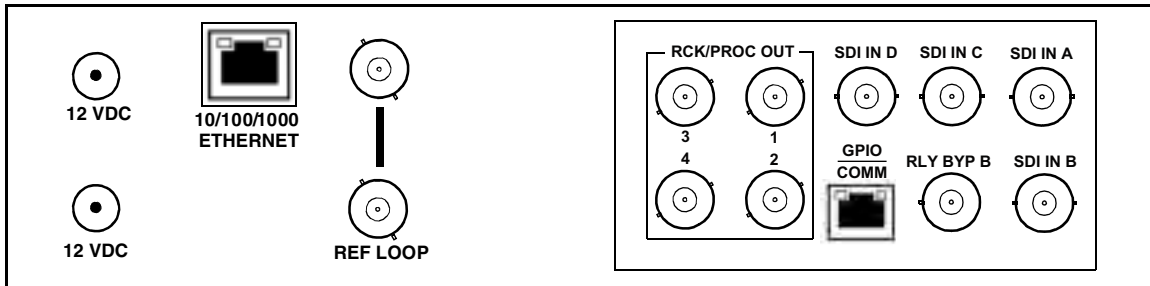
Quality Check (+QC). Provides failover on criteria such as black/frozen frame or audio silence.

Color Correction (+COLOR). Full RGB color corrector (offset, gain, gamma) with extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip.

BBG-1040-4X1-CS



Rear Panel



Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as relocked or processed outputs of the currently-selected input. RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.

Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

BBG-1040-4X1-CS**SPECIFICATIONS****Power**

< 18 Watts. Power supplied by 12VDC AC adapter, universal input (included).

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.

Weight: 6 lb (2.8 kg)

ORDERING INFORMATION

BBG-1040-4X1-CS 3G/HD/SD-SDI Modular 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control

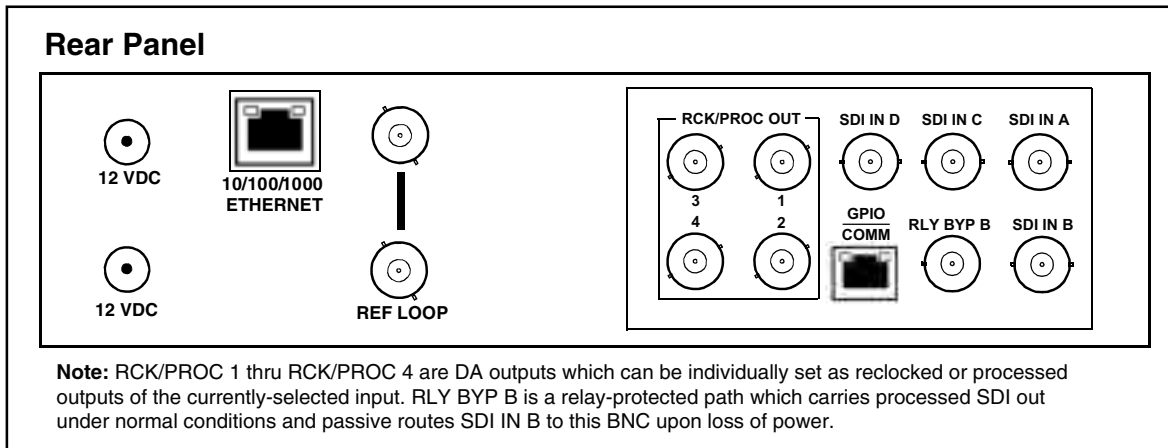
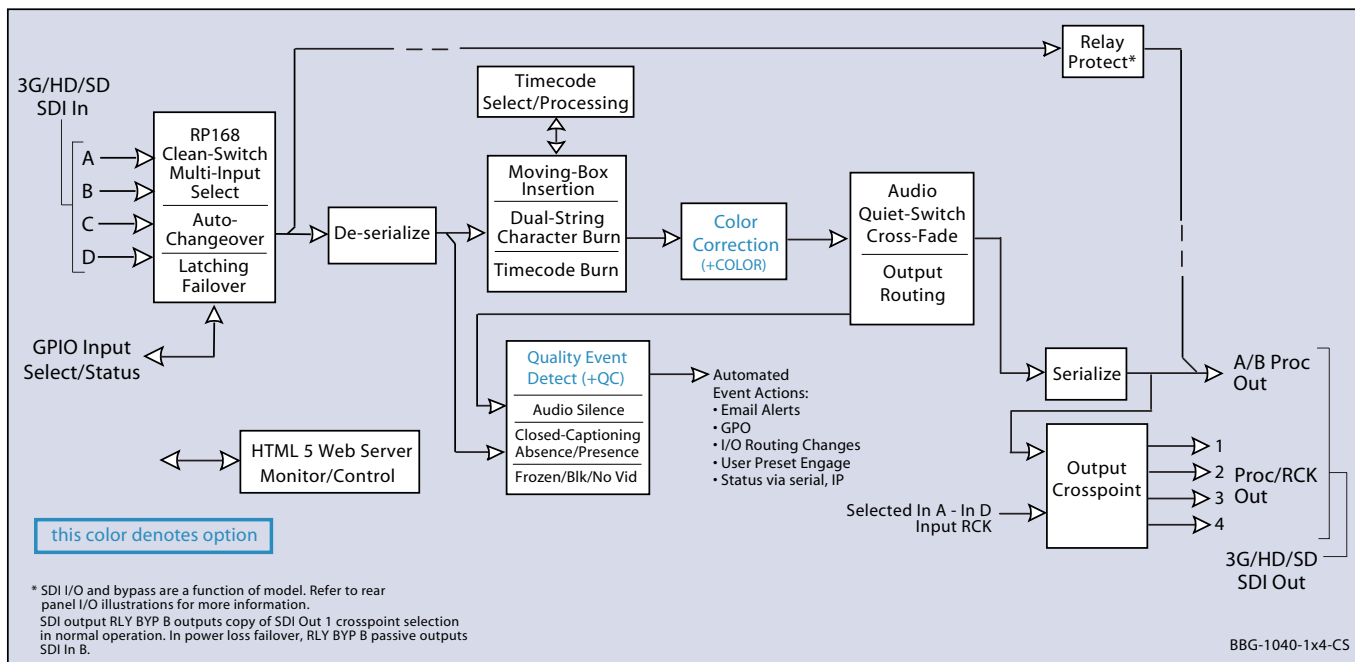
BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

+QC Quality Check Option. Provides failover on subjective criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

+COLOR Color Correction Option

BBG-1040-4X1-CS



Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

BBG-1040-4X1-CS**SPECIFICATIONS****Power**

< 18 Watts. Power supplied by 12VDC AC adapter, universal input (included).

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.

Weight: 6 lb (2.8 kg)

ORDERING INFORMATION

BBG-1040-4X1-CS 3G/HD/SD-SDI Modular 4x1 Clean and Quiet Bypass Router with Relay-Protected Input and GPIO Monitoring / Control

BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

+QC Quality Check Option. Provides failover on subjective criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

+COLOR Color Correction Option

BBG-1060-TG2-REF1 » 3G/HD/SD-SDI MODULAR DUAL TEST SIGNAL GENERATOR

with Bouncing Box Active Signal Indication, Bi/Tri-Level Sync Out, and Embedded ANC Data Signal Generator



The all-new Cobalt® BBG-1060-TG2-REF1 3G/HD/SD-SDI Modular Dual Test Signal Generator with Bouncing Box Active Signal Indication, Bi-Level Sync Out, and Embedded ANC Data Signal Generator offers an easy to use, economical solution to providing comprehensive test signal packages to ensure validity of downstream baseband SDI systems. Two independent generator blocks can be set to offer dual test packages which can be simultaneously outputted.

In addition to numerous high-quality industry-standard test patterns, the BBG-1060-TG2-REF1 also provides ANC data generators that are designed to thoroughly check all standard ANC packages (including CEA 608/708 closed captioning, SMPTE 12M timecode, SMPTE 2020 HANC audio, and SMPTE 2010 SCTE 104 test packets). Custom DID/SDID packages can be added to test non-conventional or custom processing. An ingenious Stress-Test Generator can send intentional error-bearing packets that help flush out unexpected error handling problems in downstream systems - errors are discovered and remedied in testing and setup instead of when carrying on-air programming.

The BBG-1060-TG2-REF1 also provides AES and analog audio test tones (both using 24-bit data), and also provides waveform-based test data over its CVBS video output. A moving-box insertion can be enabled to serve as a dynamic raster confidence check. The BBG-1060-TG2-REF1 can use either of two frame references to provide an output that's synchronous with house ref, or use its internal ref timing to generate its own ref. A CVBS output offers tri- / bi-level reference output, line 21 CEA 608 closed-captioning and VITC waveform test sequences. Audio LTC test sequences are available over embedded, AES, and analog audio as well as via an RS-485 serial port. Preset save/load allows saving custom settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern while not changing any other processing settings or aspects. The BBG-1060-TG2-REF1 uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web. The compact 1/3-rack size of the BBG-1060-TG2-REF1 allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame).

FEATURES

Comprehensive test signal generation for SDI/analog video and baseband discrete audio in an easily integrated standalone unit

Easy to use, intuitive, flexible, and far more economical than typical bench equipment

Fully-independent dual generator blocks offer simultaneous output of user-configured test packages, or instant user selection between generators via output crosspoint

Full array of test stimulus for SDI, including CEA608/708, packetized and waveform timecode, SCTE 104, and AFD

Moving-box/motion insertion enable serves as an easy to use dynamic raster confidence check

DID/SDID authoring allows custom payloads to be written to specific DID/SDID locations as test packets for downstream systems

Stress-Test generators provide illegal character, TRS, line length and other error cases that help flush out surprises in downstream error handling tolerance and robustness

Full suite of output interfaces - SDI, CVBS, AES and analog audio.

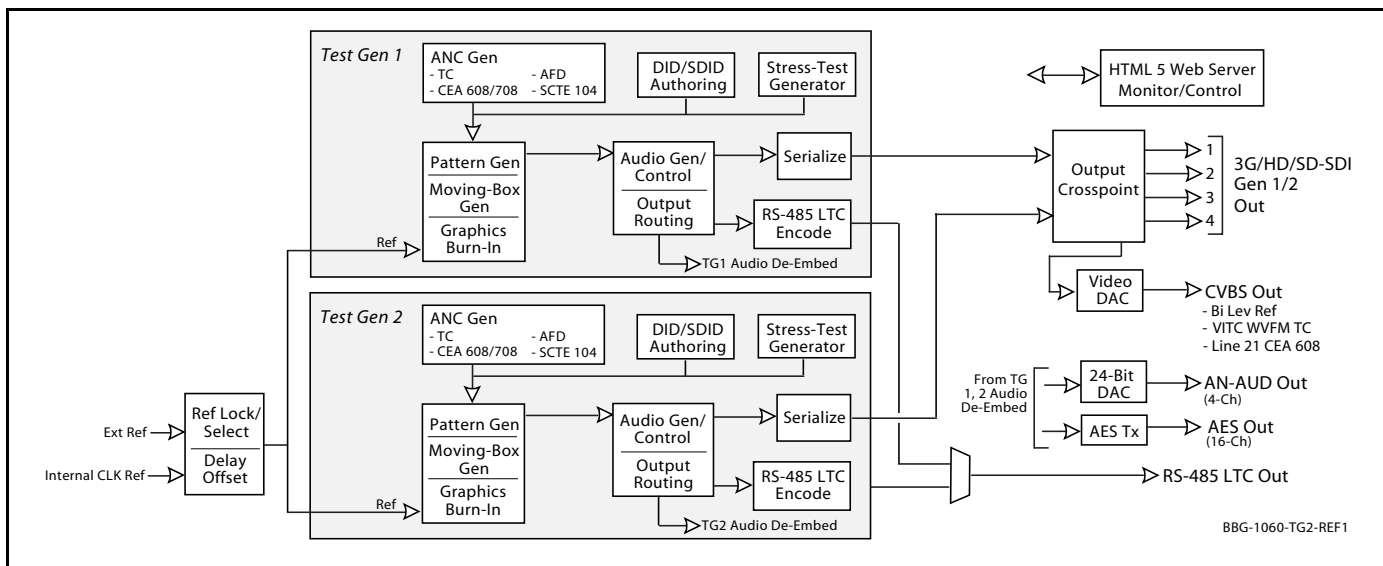
Convenience RS-485 LTC output works with legacy systems and checks bi-phase LTC/SMPTE 12 correlation in mixed systems

Low-power/high-density design - less than 18 Watts

Compact footprint - up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID

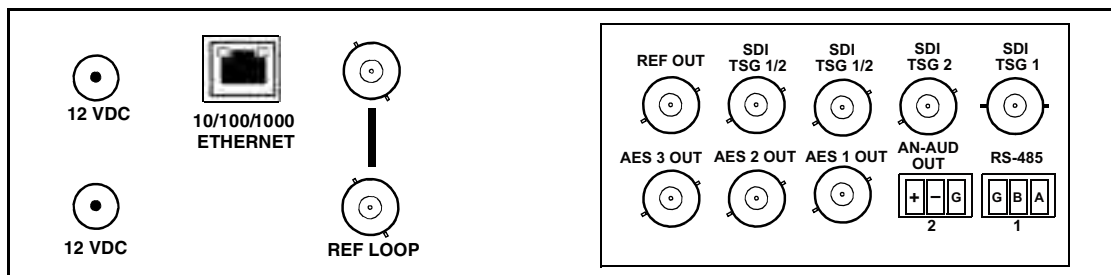
Five year warranty



BBG-1060-TG2-REF1

BBG-1060-TG2-REF1

Rear Panel



Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

SPECIFICATIONS

Power

< 18 Watts. Power supplied by 12VDC AC adapter, universal input (included).

SDI Outputs

Up to (4) 75Ω BNC outputs
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

CVBS Video Output

(1) 75Ω BNC output. CVBS output functional only when selected path is carrying SD-SDI.

Discrete AudioOutputs

AES-3id 75Ω outputs (8 pair (16-Ch) max)
Balanced analog audio outputs (4-Ch max)
(I/O conforms to 0 dBFS = +24 dBu)
Analog Output Impedance: < 50 Ω
Analog Reference Level: -20 dBFS
Analog Nominal Level: +4 dBu
Analog Max Output Level: +24 dBu (0 dBFS)
Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
Analog SNR: 115 dB (A weighted)
Analog Analog THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Embedded Audio Output

16-ch embedded. User crosspoint allows routing of any embedded channel to any embedded channel output. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Frame Reference Input

Looping 2-BNC connection. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M
Return Loss: >35 dB up to 5.75 MHz

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.
Weight: 6 lb (2.8 kg)

ORDERING INFORMATION

BBG-1060-TG2-REF1 3G/HD/SD-SDI Modular Dual Test Signal Generator with Bouncing Box Active Signal Indication, Bi-Level Sync Out, and Embedded ANC Data Signal Generator

BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

BBG-1070-QS » MODULAR 3G/HYD/SD-SDI/CVBS QUINT-SPLIT MULTI-IMAGE DISPLAY PROCESSOR



The all-new Cobalt® BBG-1070-QS 3G/HYD/SD-SDI/CVBS Modular Quint-Split Multi-Image Display Processor integrates five discrete 3G/HYD/SD-SDI or CVBS inputs onto a single 3G/HYD/SD-SDI quint-split output, with each input image being flexibly inserted into the output image area.

Fully-flexible layouts using one-button templates or custom layouts using easy to use sizing/positioning custom controls. Custom layouts can be saved to user presets. A master output up-down-cross convert scaler provides scale-to HD/SD or 3G SDI formats for the combined multiviewer output. Advanced graphics such as user identify text, PiP input video format, audio meter bars, tally/UMD, reticules, and timecode can be burned into any PiP with full user attributes control. User-configurable Quality Check allows subjective criteria such as black/frozen frame or audio silence events to propagate an on-screen alarm/alert to the output image (such as alert text burn-in or border alert highlighting).

The compact 1/3-rack size of the BBG-1070-QS allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring. DashBoard™ remote control allows easy centralized control and monitoring access.

Two user identity fields per PiP. Each can be set as user text, or to display the input video format

Independent per-PiP audio meters

Independent sizing/positioning controls for each PiP using one-button templates or easy to use slider controls. Burn-in insertions are independently configurable for insertion enable, size/position, color, background, and opacity.

User-configurable reticules

Independent per-PiP timecode burn-in

Per-PiP UMD text and tally indicators

User-configurable alerts with special borders and text

BBG-1070-QS

FEATURES

Scalable PiP solution in a compact standalone form factor

Easy to configure PiP sizing and borders. Advanced graphics include audio meters, character burn, and reticules. PiP sizing/splits using one-button templates or easy-to-use, intuitive web GUI controls. Custom settings can be saved to user presets.

Fully flexible input compatibility – mixed formats on inputs can be automatically sized and outputted in a combined output scaled to desired broadcast SD/HD/3G output format. Each input automatically detects and sets up for SDI or CVBS input. Per-PiP independent SD and HD ARC settings and controls.

Supports asynchronous video inputs

Per-PIP audio meter, tally, user text, and timecode overlays

GPI, Ethernet, and serial tally inputs provide dual, per-PIP tally indicators

User quality criteria (such as frozen/black frame) alert/alarms can be propagated to output image with alarm text and border highlighting

Audio routing directs selected PiP audio to combined-stream outputs. Audio downmixing also provided.

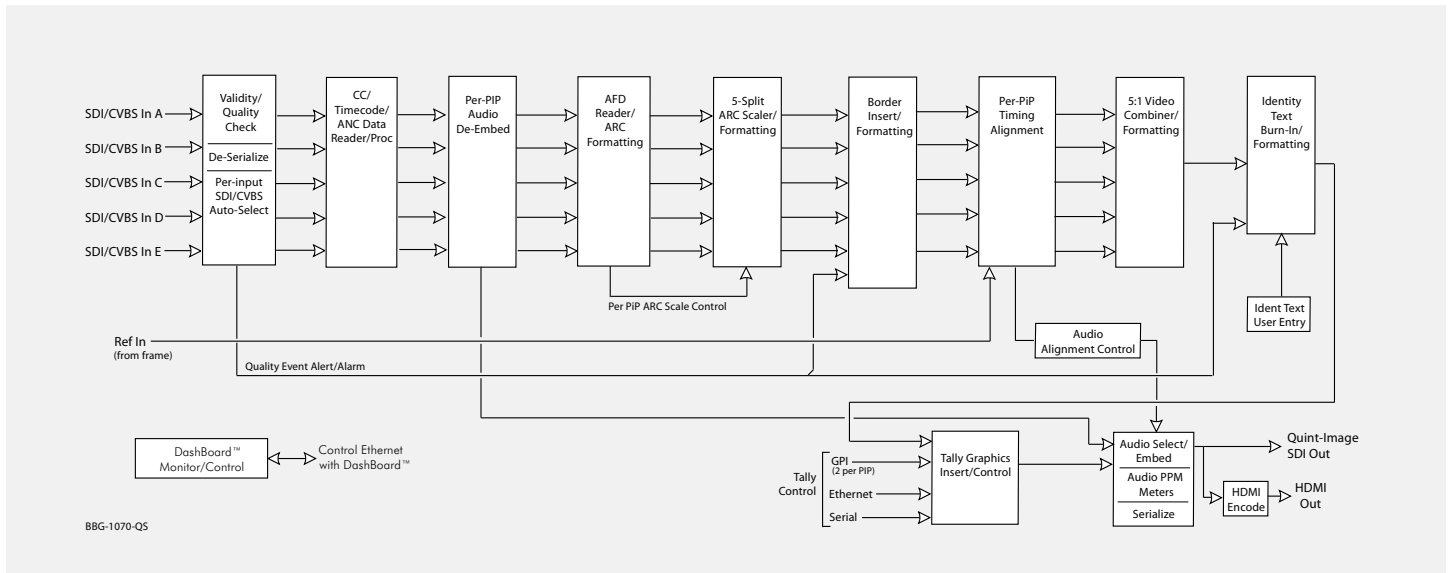
3G/HD/SD-SDI and HDMI with audio embed outputs

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID

Redundant power supply option

Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Five year warranty



Pressing the **Identify PIPs** button in DashBoard™ instantly correlates each image to its PiP card channel. The identities are clearly shown for a few seconds, after which the identify overlays automatically cancel.

BBG-1070-QS

SPECIFICATIONS

Power

< 18 Watts. Power supplied by 12VDC AC adapter, universal input.

Video Input/Outputs

Video Inputs: (5) 75Ω BNC; auto-detect/setup for 3G/HD/SD-SDI or CVBS

SDI Output: (1) 3G/HD/SD-SDI 75Ω BNC

HDMI Output: (1) HDMI output with audio embedding

Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timecode Burn-In

Independent per-PIP burn-in via user controls from input video SMPTE embedded timecode. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size, color, and H/V position.

Text Burn-In

Per-PiP UMD and two user identity text strings (as alternate, automatic PiP input video format can be inserted). Independent insertions controls for enable/disable. User controls for text size, color, and H/V position.

Audio Output

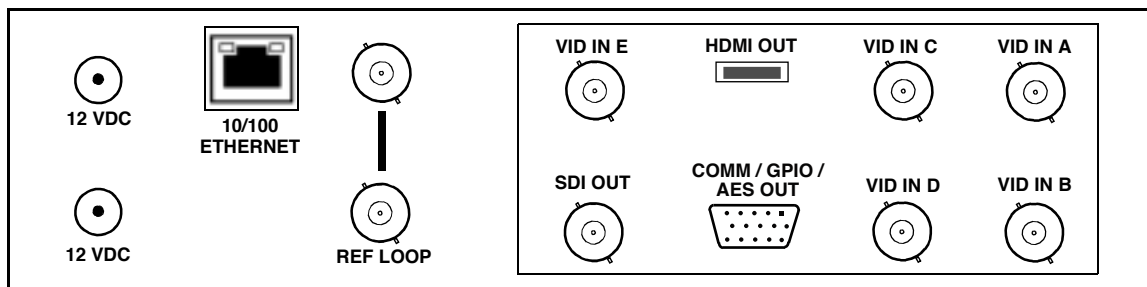
16-ch embedded. Per-PIP select allows routing of PIP input 16-ch embedded audio to combined SDI output. HDMI output tracks with group 1/2 audio as selected for SDI embedded audio output.

Tally Indicators/Inputs

Per-PiP dual tally indicators. (5) GPI inputs (total). GPI can be configured for multiple actions across multiple PiPs; Ethernet tally input, serial tally input. Per-PiP tally lamp position and sizing controls.

Frame Reference Input

Looping reference input. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level".



COMM / GPIO / AES OUT

- 1 - *COM A_RX2 / 422(+)
- 2 - *COM A_TX2 / 422(+)
- 3 - COM B_RX2 / 422(+)
- 4 - GPO OUT1
- 5 - GND
- 6 - *COM A_RX1 / 422(-)
- 7 - *COM A_TX1 / 422(-)
- 8 - COM B_RX1 / 422(-)
- 9 - GPI IN5
- 10 - GPI IN4
- 11 - GPI IN1
- 12 - GPI IN2
- 13 - GPI IN3
- 14 - AES OUT1(+)
- 15 - AES OUT2(+)

* Port can be GUI-configured as two RS-232 ports (Tx and Rx), or as a full-duplex RS-422 port.

ORDERING INFORMATION

BBG-1070-QS 3G/HD/SD-SDI/CVBS Modular Quint-Split Multi-Image Display Processor

BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

BBG-1078-ANC-MON » 3G/HD/SD-SDI MODULAR DATA MONITORING PROBE

with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding



The all-new Cobalt® BBG-1078-ANC-MON 3G/HD/SD-SDI Modular Ancillary Data Monitoring Probe with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding provides an easy to use, economical solution that offers comprehensive ancillary data monitoring/"probing" to validate and ensure expected presence and handling of ancillary data in SDI streams.

Unlike expensive and hard to use waveform monitors, the BBG-1078-ANC-MON provides on-screen burn-in status in "plain language" text and icons. Unlike typical test equipment, its user interface is designed from the ground up to be used by everyday operations personnel and not just engineers. The status burn-in is available on the card SDI output as well as a convenience HDMI output that can be directly connected to a wall monitor.

In addition to its user interface, the BBG-1078-ANC-MON can integrate with automation systems via its serial, GPIO, IP and SNMP interfaces. The BBG-1078-ANC-MON is an unprecedented first in a compact standalone form factor that fits in your existing environment without the need for expensive, delicate, bulky test gear. Depending on the ANC data you want

to monitor, the BBG-1078-ANC-MON is available with options to support many data packages such as SCTE 104, 608-XDS, AFD and others, providing not just presence/absence status but also interpreters that parse the payload and display it as a burn-in. Options also include a continuously running display of ATSC A/85 LKFS loudness.

A built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1078-ANC-MON allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring.

Intuitive layout clearly and simultaneously showing multiple aspects of the input signal and its ancillary data are displayed in real time along with programming.

Conditions for any number of criteria are immediately apparent via color coding to indicate normal operation, errors, ancillary data absence or other errors. No difficult nested menus or difficult to interpret messages.



FEATURES

Easy to use, economical solution for comprehensive ancillary data monitoring/"probing"

"Plain language" easy to understand status burn-in overlay displayed along with program video makes status monitoring easy. HDMI output allows use with standard consumer monitor panels.

Quality Check provides immediate alert status for quality issues such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

On-screen presence/absence of selected DID/SDIDs

Fully flexible and configurable with user presets to simplify setup

Flexible options allow extra monitoring capabilities such as SCTE 104, AFD, and 608-XDS monitoring and payload interpret.

Full status forwarding to automated systems using serial, GPIO, IP, and SNMP interfaces

Low-power/high-density design - less than 18 Watts

Compact footprint - up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID

Five year warranty

OPTIONS

Closed-Captioning Metadata Interpreter (+CCINT). Extracts and interprets CC payload for burn-in and as data export via serial and/or IP

SCTE 104 Metadata Interpreter (+SCTE104INT). Extracts and interprets SCTE 104 payload for burn-in and as data export via serial and/or IP

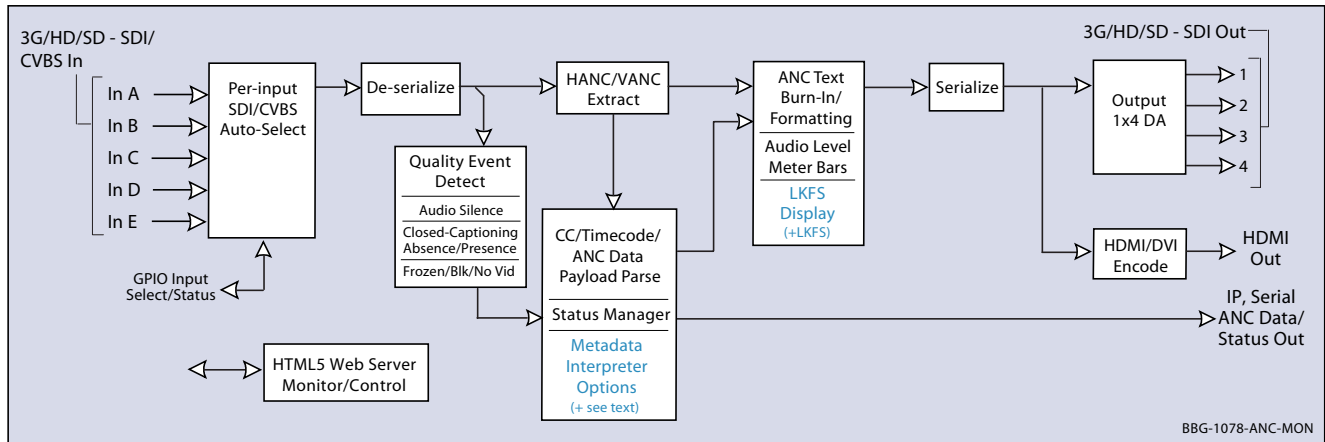
AFD Metadata Interpreter (+AFDINT). Extracts and interprets AFD payload for burn-in and as data export via serial and/or IP

CEA608 Extended Services Presence Indication (+608XDS). Displays as burn-in presence/active status for services 1-4. Also allows this status to be exported via serial and/or IP.

Camera Metadata Interpreter (+CAM-META). Extracts and interprets camera control metadata payload for burn-in and as data export via serial and/or IP

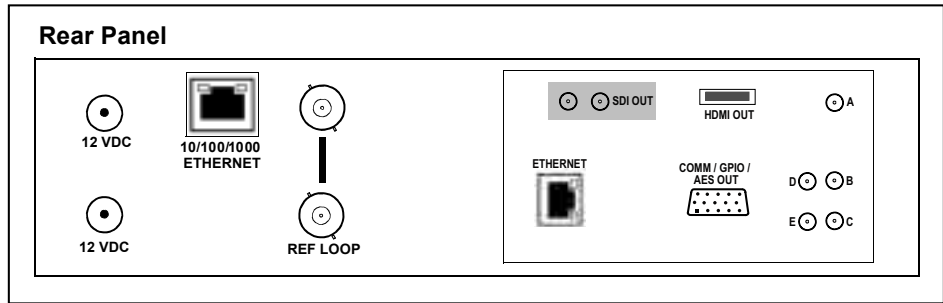
LKFS Measurement Option (+LKFS). Provides running LKFS display of all selected channels routed to the LKFS measurement block.

BBG-1078-ANC-MON



BBG-1078-ANC-MON

Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.



SPECIFICATIONS

Power
 < 18 Watts

Video Input/Outputs
 Video Inputs: (5) 75Ω BNC; auto-detect/setup for 3G/HD/SD-SDI or CVBS |
 SDI Outputs: (4) 75Ω BNC
 HDMI Output: (1) HDMI output with audio embedding
 SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
 SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
 SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

GPIO/COMM
 (2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface
 HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Frame Reference Input
 Looping 2-BNC connection. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level"
 Return Loss: >35 dB up to 5.75 MHz

Physical
 Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.
 Weight: 6 lb (2.8 kg)

ORDERING INFORMATION

BBG-1078-ANC-MON-C-DIN 3G/HD/SD-SDI Modular Ancillary Data Monitoring Probe with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding. (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI DA Outputs, COMM/GPIO/AES Out (Combined HD-15 connector), HDMI Output, Ethernet Port (all coaxial connectors DIN 1.0/2.3)

BBG-1078-ANC-MON-C-HDBNC 3G/HD/SD-SDI Modular Ancillary Data Monitoring Probe with Multiple-Protocol Data Payload SDI/HDMI Display and Fault Detection/Forwarding. (5) 3G/HD-SD-SDI/CVBS Inputs, (2) 3G/HD/SD-SDI DA Outputs, COMM/GPIO/AES Out (Combined HD-15 connector), HDMI Output, Ethernet Port (all coaxial connectors HD-BNC)

BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

- +AFDINT AFD Metadata Interpreter Option
- +CAM-META Camera Metadata Interpreter Option
- +CCINT Closed-Captioning Metadata Interpreter Option
- +LKFS LKFS Measurement Option
- +SCTE104INT SCTE 104 Metadata Interpreter Option
- +608XDS CEA608 Extended Services Presence Indication Option

BBG-1080-CSC-3G » 3G/HD/SD-SDI MODULAR RGB COLOR SPACE CORRECTOR.FRAMESYNC with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support



The all-new Cobalt® BBG-1080-CSC-3G 3G/HD/SD-SDI Modular RGB Color Space Corrector / Framesync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support provides a high-density standalone solution that includes an advanced framesync/pattern generator in addition to a full-featured SD/HD/3G color corrector. The BBG-1080-CSC-3G offers RGB-space color correction with YCbCr proc features with RGB processing controls providing full offset, gain and gamma adjustments. The YCbCr proc controls provide lift, gain, saturation, phase, white clip (hard and soft), black clip, and color saturation clip.

The built-in pattern generator preceding the color correction block allows patterns (such as 75% or 100% bars) to be pre-emphasized or de-emphasized by the color corrector to match on-set camera colorimetry, with the custom settings saved to a preset, resulting in one-button recall of monitor/camera calibration settings. Any custom settings can be saved to user presets for instant recall via DashBoard or our intuitive OGCP-9000/CC Color Correction Remote Control Panel.

Preset save/load allows saving custom settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. The BBG-1080-CSC-3G uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1080-CSC-3G allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame). GPIO allows direct input routing control and status monitoring.

FEATURES

Full RGB color corrector (offset, gain, gamma)

Framesync with full H/V offset and manual/LOS video pattern generator. Pattern generator in front of color corrector provides custom offset calibrations for on-set monitor/camera characteristics calibrated settings

Passes entire YCbCr gamut in unity gain configuration

10-bit gamma LUT

Extended YCbCr proc controls with white hard clip, white soft clip, black hard clip, and saturation clip

Phase preserved when applying saturation clip

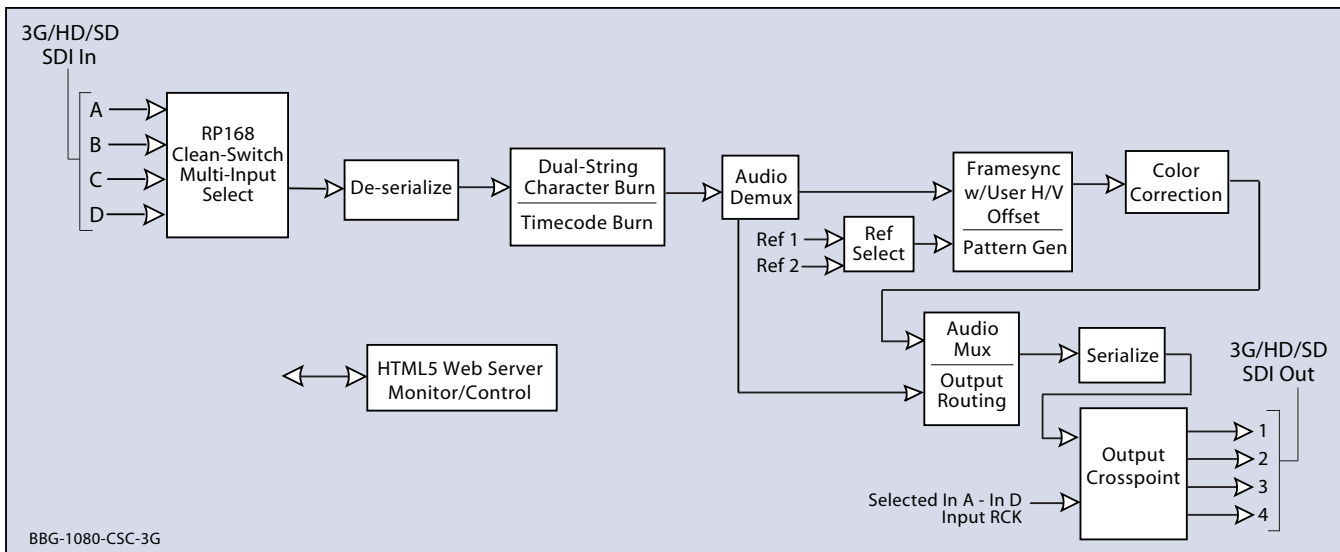
One button bypass of color correction for comparison purposes

Low-power/high-density design – less than 18 Watts

Compact footprint – up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray.

Web-based user interface/remote control as well as front-panel pushbutton menu-based local control with LCD status/net ID

Five year warranty

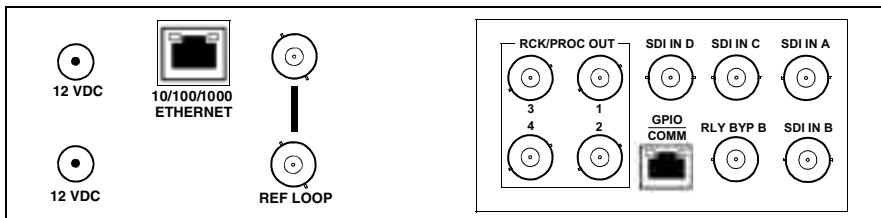


BBG-1080-CSC-3G

BBG-1080-CSC-3G

Rear I/O complement and details shown are preliminary and subject to change. Please check the product web page for updates and availability of new models.

Rear Panel



Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input. RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.

SPECIFICATIONS

Power

< 18 Watts

SDI Input/Outputs

Up to (4) 75Ω BNC inputs

Up to (4) 75Ω BNC outputs

SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M

SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)

SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz

SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI

Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

Framesync Audio/Video Delay

Max offset: 20 frames

Latency (min): 1 frame

Frame Reference Input

(2) reference from frame bus. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level".

Return Loss: >35 dB up to 5.75 MHz

RGB Color Correction

RGB Black Adjust (one per primary): -100% to 100% in 0.1% steps

RGB White Adjust (one per primary): 0% to 200% in 0.1% steps

RGB Gamma Control (one per primary): 0.125 to 8.0 in 0.001 steps

YCbCr Processing Amp

White Adjust (Gain): 0 to 200% in 0.1% steps

Black Adjust (Lift): -100% to 100% in 0.1% steps

C Gain (Saturation): 0% to 200% in 0.1% steps

Color Phase: -360° to +360° in 0.1 degree steps

YCbCr Clip

Y Black hard clip (values limited at or above): -6.8% to 50% in 0.1% steps

Y White hard clip (values limited at or below): 50% to 109.1% in 0.1% steps

Y White soft clip (values rolled off at): 50% to 109.1% in 0.1% steps

CbCr Saturation clip (values limited at or below): 50% to 160% in 0.1% steps

GPIO/COMM

(2) GPI configurable to select input routing. (2) GPO configurable to invoke upon input selected. RS-232/485 comm port. All connections via rear module RJ-45 GPIO/COMM jack.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.

Weight: 6 lb (2.8 kg)

ORDERING INFORMATION

BBG-1080-CSC-3G 3G/HD/SD-SDI Modular RGB Color Space Corrector / Framesync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

BBG-1000-PS Redundant Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

OGCP-9000/CC 2RU Remote Control Panel for Color Correction (Specify country of destination for power cord)

BBG-1090-DEC-MPEG » MPEG4 AVC & MPEG2 MODULAR DECODER WITH ASI & IP INPUTS & SDI OUTPUTS

with support up to 3G 1080p 60



The all-new Cobalt® BBG-1090-DEC-MPEG MPEG4 AVC and MPEG2 Decoder with ASI and IP Inputs and SDI Outputs with support up to 3G 1080p 60 provides a high performance real-time MPEG-2 and MPEG-4 SD and HD video decoding solution. Its design is practically future proof and decodes traditional video formats such as UDP and RTP (MPEG Transport Stream) as well as Internet and Mobile formats such as RTMP (Adobe® Flash) and HLS (Apple® HTTP Live Streaming).

The BBG-1090-DEC-MPEG supports newer cameras that output RTMP and security cameras that output RTSP. Its high-density, low power design saves on operating expenses, with up to 10 cards installed in a 20-slot openGear® frame. IP and DVB-ASI input streams are supported, with outputs as ASI, DVB-ASI, SDI, HDMI, and CVBS (for SD streams) using MPEG4 AVC or MPEG2 decoding. The BBG-1090-DEC-MPEG can decode from several audio codecs and provides Dolby® pass-thru.

Full user DashBoard™ remote control allows full status and control access locally or across a standard Ethernet network. A complete SNMP MIB is also included.

FEATURES

Comprehensive MPEG decoding solution – MPEG4 AVC and MPEG2 to ASI, SDI, HDMI and CVBS with built-in audio codecs. Convenience IP output also.

Supports RTMP and RTSP sources

MPEG-1 Layer II, AAC -LC, AAC-HE, E-AC-3 and AC-3 audio decoding standard. Dolby pass-thru (Dolby decode option available).

DVB-ASI Turnaround to IP and ASI with SPTS Splitting

IP reception of unicast or multicast

Several options available for scalable configuring

SNMP MIB included

Low-power/high-density design – less than 14 Watts

Remote control/monitoring via Dashboard™ software

Five year warranty

OPTIONS

Dolby® Decode License (+DEC-DDEC). Allows Dolby audio to be decoded as SDI embedded PCM audio or analog audio output

SMPTE 2022 Forward Error Correction License (+FEC)

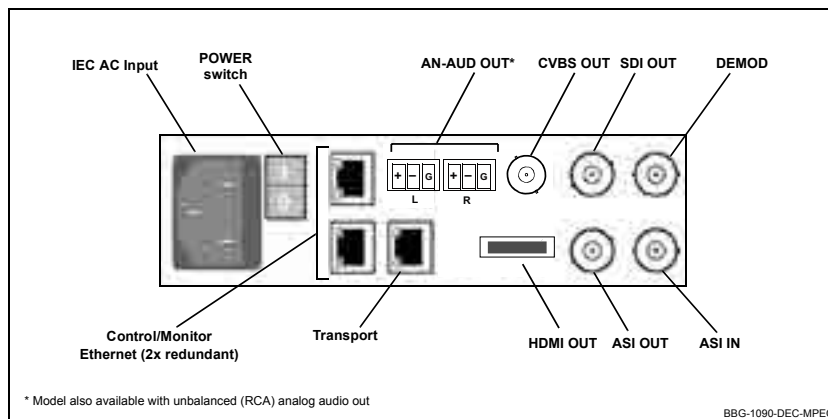
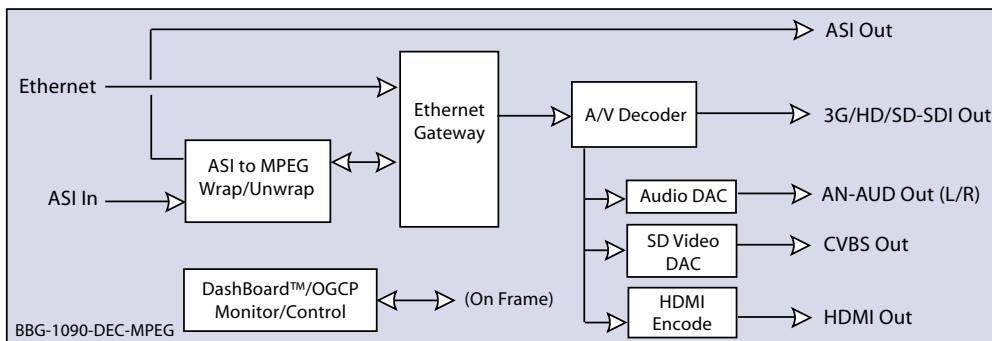
IP License (+IP)

Automatic Repeat Request License (+ARQ)

Monitoring License (+TSMON)

Genlock License (+GENLOCK)

Stream Splitting License Option (+SPTS)



BBG-1090-DEC-MPEG**SPECIFICATIONS****Power**

100-250 VAC, 47-63 Hz, 14 Watts

Inputs

(1) DVB-ASI 75Ω BNC
 (1) IP; 1000Base-T RJ-45
 Gen lock (from frame ref 1/2)

Outputs

(1) 3G/HD/SD-SDI 75Ω BNC
 (1) CVBS 75Ω BNC
 (1) DVB-ASI 75Ω BNC
 (1) HDMI
 (2) Analog Audio Out L/R (balanced 3-pin terminals or unbal RCA depending on rear module used)

Network Transport Protocols

UPD (Unicast or Multicast)
 RTP (Unicast or Multicast)
 RTMP (Adobe Flash)
 RTSP (Security Camera)
 SMPTE 2022 Pro-MPEG-FEC
 ARQ

Video Resolution

HD:
 1080 x 1920p - 60/50
 1080 x 1920/1440i - 25/29.97/30
 720 x 1280p/960 - 50/59.94
 960 x 540 - 25/29.97
 SD:
 480 x 720/704/640/528 - 29.97
 360 x 640p - 29.97
 576 x 720/704/640/528 - 25
 Lower Resolutions:
 480x270, 320x240, 320x180

Audio Codec Supported/Processing

MPEG-1 Layer 2 (mp2)
 AAC-LC
 HE-AAC
 AC-3
 E-AC-3
 Dolby® pass-thru

ORDERING INFORMATION

BBG-1090-DEC-MPEG MPEG4 AVC and MPEG2 Modular Decoder with ASI and IP Inputs and SDI Outputs with support up to 3G 1080p 60

+ARQ ARQ License Option

+DEC-DDEC Dolby® Decode License Option

+FEC SMPTE 2022 Forward Error Correction License Option

+GENLOCK Genlock License Option

+IP IP License Option

+SPTS SPTS Stream Splitting License Option

+TSMON Monitoring License Option

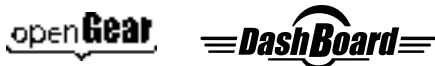
BBG-1090-ENC-H264 (9223-SA))) DUAL-CHANNEL 3G/HD/SD MPEG-4 ENCODER UNIT



The BBG-1090-ENC-H264 provides a compact form-factor standalone unit for distribution of MPEG-4 encoding. Utilizing the openGear® open-architecture control/monitoring platform, the BBG-1090-ENC-H264 can be remotely controlled and monitored with the free, easy-to-use DashBoard™ setup and control operator interface. (When connected to your network, the BBG-1090-ENC-H264 appears in DashBoard just like any other device.) The BBG-1090-ENC-H264 includes dual redundant 10/100/1000 Mb/s Ethernet ports for control.

The BBG-1090-ENC-H264 offers the latest advances in video compression that delivers excellent video quality at very low bit rates. Unique encoding designs allow delivery of multiple HD and SD video services simultaneously. In addition to SD/HD-SDI/3G-SDI inputs, the BBG-1090-ENC-H264 provides the flexibility of supporting SD analog composite video and one pair of analog stereo audio per channel (using MPEG-1 Layer II audio encoding as standard). The BBG-1090-ENC-H264 features two ASI outputs, as well as two simultaneous transport Ethernet outputs, supporting full-duplex 100 Mb/s and 1 Gb/s operation. Input video auto-detect mode allows encoding to automatically configure an output that correspond to the input, with resolution and frame rate same as input, and scaling set to same as input or other applicable choices.

When using the Ethernet output, the BBG-1090-ENC-H264 supports the traditional UDP/RTP/SPMTE 2022 FEC protocols, as well as the HTTP Live Streaming protocol for transmitting live video over the Internet. Using HTTP Live Streaming, the BBG-1090-ENC-H264 can transmit broadcast-quality video to mobile phones (Apple and Android 4.0 supported), tablets, and a variety of consumer set-top boxes (such as the Amino A140 and the Roku Player).



RTMP support allows direct publishing of real-time, live content to Adobe® Media Servers or any other servers, web sites and CDNs with RTMP ingress, such as Justin.tv, UStream, LiveStream and Akamai. Publish professional-quality real-time SD/HD content to Internet viewers (including some critical features not available in PC-based software encoders) such as ancillary data support (closed-captioning, AFD) and SD-SDI/HD-SDI video inputs with embedded audio support – all in broadcast-grade video quality.

Full user remote monitor/control allows full device status and control access across a standard Ethernet network.

)) FEATURES

Compact self-contained form with built-in AC power supply

Input video auto-detect mode automatically configures output to correspond to input frame rate and scaling

DVB-ASI and Ethernet outputs

Full support of CEA-608 and CEA-708 closed captioning and PMT information

RTMP support for publishing to Adobe® Media Server, availing SDI content to Internet viewers.

HTTP Live Streaming protocol allows viewing by Apple® and Android™ 3.0 (or higher) devices.

License-based options allow packages limited to only options needed for each unit and its processed channels
Built-in video/audio ADC and embedder allows direct use with SD composite video and audio analog sources

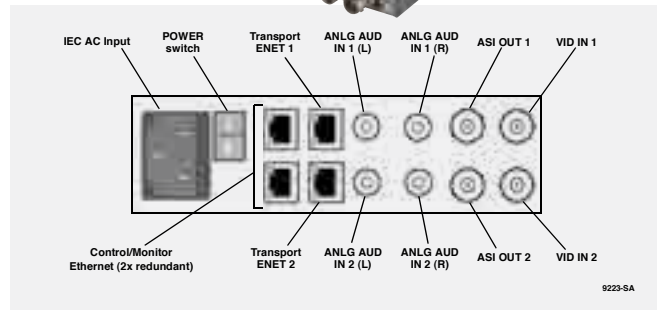
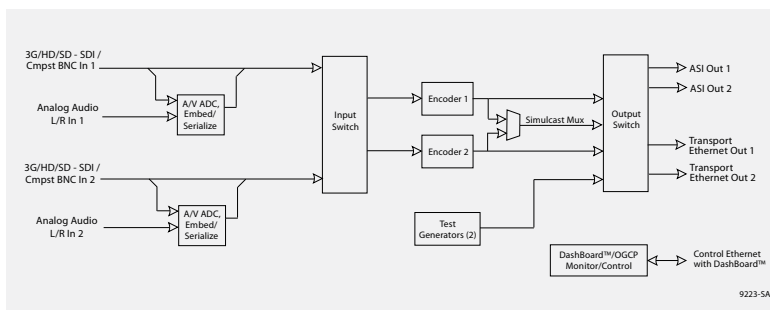
Built-in Packet Test Generators allow pre-validation of transport

Optional support for additional audio pairs per encoded output

Multiple pre-defined control templates provide automatic setup of popular contribution-to-distribution schemes

Ethernet remote control/monitoring via free DashBoard™ software

Five-year warranty



BBG-1090-ENC-H264 (9223-SA)

SPECIFICATIONS

Electrical

Power: 100-250 VAC, 47-63 Hz, 15W

3G/HD/SD-SDI Inputs

Number of inputs: 2, each configurable as:
 3G-SDI (SMPTE 424M)
 HD-SDI (SMPTE 292M)
 SD-SDI (SMPTE 259M) with EDH
 Composite analog video (PAL/NTSC)

Audio Inputs Supported

Embedded SDI, AC-3 (optional),
 Unbalanced stereo audio via RCA jacks

Video Encoding

Dual-channel HD Video:
 MPEG-4 AVC High profile at level 4.2 (HP@L4.2)
 MPEG-4 AVC High profile at level 4.0 (HP@L4.0)
 CBR & VBR
 2Mbps to 30Mbps (configurable)
 Dual channel SD Video:
 MPEG-4 AVC Main profile at level 3.0 (MP@L3.0)
 CBR & VBR
 1.5Mbps to 10 Mbps (configurable)

ASI Outputs

Number of outputs: 2, 75Ω BNC DVB-ASI
 213Mbit/s maximum ASI TS bit-rate per port

Audio Encoding

MPEG-1 layer II, up to 2 stereo pairs
 Dolby® Digital AC 3 (optional)
 MPEG-4 AAC-LC up to 2 pairs
 MPEG-2(ADTS) & MPEG-4(LATM/LAOS encapsulation)
 Lip sync adjustment

Video Resolution Supported

HD: 1080 x 1920p 60/50
 1080 x 1920/1440i 25/29.97/30
 720 x 1280/960/640p 50/59.94
 SD: 576 x 720/528i 29.97fps
 576 x 720/528i 25fps

Video Pre-Processing

Advanced adaptive spatial filtering
 Closed Captions CEA 608B & CEA-708C
 WSS/AFD
 Teletext (WST system B)

Ethernet

Number of control/monitor connections:
 2, redundant 10/100Base-T RJ-45
 Number of transport outputs:
 2, 100/1000Base-T RJ-45
 ports, auto-negotiate or fixed speed
 IPv4,IPv6 ,UDP & RTP
 SMPTE 2022 ProMPEG FEC CoP3,
 'Forward Error Correction'
 (Row and Column)

Regulatory Compliance

CE: CE marked in accordance with
 93/68/EEC (22/07/03) Directive
 UL: UL approval
 US FCC: Part 15
 EMC: EN55022, EN55024, EN6100-3-2

Physical

Dimensions (WxHxD): 5.8 x 1.8 x 14 in
 (14.7 x 4.6 x 35.6 cm)
 (including component projection)

Options

Note: Some options listed here are upgrades for the single-channel version of this product. Refer to Ordering Information for further details.

Upgrade License; SD Channel to HD up to 1080i (**+SD-HD-I-SA**)
 Upgrade License; SD Channel to HD up to 1080p (**+SD-HD-P-SA**)
 Upgrade License; HD 1080i Channel to HD 1080p (**+HD-I-HD-P-SA**)
 AAC Audio License; one AAC-LC Stereo Channel (**+UP-AAC-SA**)
 Additional Audio Pair License; allows an additional audio pair (from an SDI embedded pair) to be encoded along with base single-pair embedding. See Ordering Information for more details. (**+2A-SA**)
 SMPTE 2022 FEC Insertion License. Provides one FEC insertion per device Ethernet port (one +SMPTE2022FEC license max. per device) (**+SMPTE2022**)
 Add Encoder Second Channel H.264 SD (applicable for single-channel version 9223-SA-S) (**+SD-SA**)
 Add Encoder Second Channel H.264 SD/HD (up to 1080i) (applicable for single-channel version 9223-SA-S) (**+HD-SA-I**)
 Add Encoder Second Channel H.264 SD/HD (up to 1080p) (applicable for single-channel version 9223-SA-S) (**+HD-SA-P**)
 1 RU Rack Mount Tray (supports up to 3 modular chassis units) (**TRAY**)

BBG-1090-ENC-H264 (9223-SA)

ORDERING INFORMATION

Note: This product is identified as BBG-1090-ENC-H264 as well as legacy part number 9223-SA. Either part number is valid for ordering, or for reference or for information.

9223-SA-D Dual-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD

9223-SA-D-HD-I Dual-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080i

9223-SA-D-HD-P Dual-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080p

+SD-HD-I-SA Upgrade License; SD Channel to HD up to 1080i

+SD-HD-P-SA Upgrade License; SD Channel to HD up to 1080p

+HD-I-HD-P-SA Upgrade License; HD 1080i Channel to HD 1080p

+UP-AAC-SA AAC Audio License

+2A-SA Additional Audio Pair License

+SMPTE2022 SMPTE 2022 FEC License

TRAY 1 RU Rack Mount Tray (supports up to 3 modular chassis units)

Single-Channel Alternate Models and Add Channel Upgrade Licenses

9223-SA-S Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD

9223-SA-S-HD-I Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080i

9223-SA-S-HD-P Single-Channel 3G/HD/SD MPEG-4 Encoder Unit with H.264 SD/HD up to 1080p

+SD-SA Add Encoder Second Channel H.264 SD (applicable for single-channel unit 9223-SA-S)

+HD-I-SA Add Encoder Second Channel H.264 SD/HD (up to 1080i) (applicable for single-channel unit 9223-SA-S)

+HD-P-SA Add Encoder Second Channel H.264 SD/HD (up to 1080p) (applicable for single-channel unit 9223-SA-S)

Note: The Upgrade, Audio, and SMPTE2022 licenses above are also available for single-channel alternate models.

Single-Channel Encoders 9223-S (9223-SA-S)		
Base	One +2A License	Two +2A Licenses
1 Stereo PID	2 Stereo PIDs	3 Stereo PIDs
Dual-Channel Encoders 9223-D (9223-SA-D)		
Base	One +2A License	Two +2A Licenses
2 Stereo PIDs	3 Stereo PIDs (Added PIDs per licensing can be applied to Encoder 1 or Encoder 2 channels)	4 Stereo PIDs (Added PIDs per licensing can be applied to Encoder 1 or Encoder 2 channels as desired, also including configuring the device as single-channel with 4 total Stereo PIDs in one encoder channel)
Note: <ul style="list-style-type: none"> • Maximum of two (2) +2A licenses can be added to single-channel (-S) or dual-channel encoder (-D). • For Dual-Channel Encoders, added +2A audio channels can only be sourced from de-embedded SDI. 		



BBG-1090-GW-IPASI (9220-SA)))

BIDIRECTIONAL ASI/MPTS GATEWAY UNIT

OPTIONS

Additional ASI or IP Transport Stream Output (+TS-SA)
Second Gigabit Ethernet Port (+GBE-SA)



The BBG-1090-GW-IPASI provides a compact form-factor standalone bidirectional ASI/IP gateway that can receive transport streams over ASI and transmit streams over IP, or receive transport streams over IP and transmit streams over ASI. Utilizing the openGear® open-architecture control/monitoring platform, the BBG-1090-GW-IPASI can be remotely controlled and monitored with the free, easy-to-use DashBoard™ setup and control operator interface. (When connected to your network, the BBG-1090-GW-IPASI appears in DashBoard just like any other device.)

It features up to 6 ASI ports, individually configurable as inputs or outputs. With option +TS-SA, the BBG-1090-GW-IPASI can support up to six ASI/IP bidirectional conversions simultaneously (standard support with no additional licenses supports one ASI/IP bidirectional gateway). The BBG-1090-GW-IPASI can be used to facilitate seamless plant distribution/contribution over IP. It also includes advanced redundancy protection features, allowing for automatic failover if the primary signal disappears. The BBG-1090-GW-IPASI supports both unicast and multicast, with IGMP V1, V2 and V3. DashBoard™ remote control allows easy centralized control and monitoring access.

FEATURES

Compact self-contained form with built-in AC power supply

Up to six ASI inputs/outputs supported (standard supports one ASI/IP gateway with up to five additional with corresponding +TS-SA licensing)

Bidirectional ASI/IP encapsulation or de-encapsulation
1x Gigabit Ethernet IP interface

Optional 2x Gigabit IP interface

Multicast IGMP v1, v2, and v3 support

Ethernet remote control/monitoring via free DashBoard™ software

Five year warranty

SPECIFICATIONS

Electrical

Power: 100-250 VAC, 47-63 Hz, 15W

DVB-ASI Input/Output

Number of ports: 6 (max) bi-directional, 75Ω BNC

DVB-ASI

213Mbit/s maximum ASI TS bit-rate per port

Network I/O

Number of ports: 2, 100/1000Base-T RJ-45

IPv4, IPv6, UDP & RTP

900Mbit/s usable GbE per Rx port

900Mbit/s usable GbE per Tx port

600Mbit/s maximum processing per card

213Mbit/s maximum ASI TS bitrate per port

Regulatory Compliance

CE: CE marked in accordance with 93/68/EEC (22/07/03) Directive

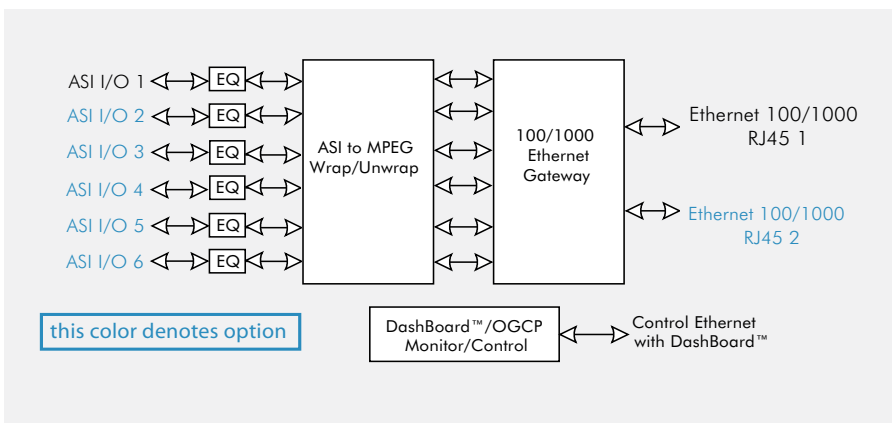
UL: UL approval

US FCC: Part 15

EMC: EN55022, EN55024, EN6100-3-2

Physical

Dimensions (WxHxD): 5.8 x 1.8 x 14 in (14.7 x 4.6 x 35.6 cm) (including component projection)



ORDERING INFORMATION

Note: This product is identified as BBG-1090-GW-IPASI as well as legacy part number 9220-SA. Either part number is valid for ordering, or for reference or for information.

BBG-1090-GW-IPASI Bidirectional ASI/MPTS Gateway Unit

+TS-SA Optional Additional ASI or IP Transport Stream Output

+GBE-SA Optional Activated Second Gigabit Ethernet Port

TRAY 1 RU Rack Mount Tray (supports up to 3 modular chassis units)

BBG-1090-TRX-MPEG))

MULTI-STANDARD MODULAR BROADCAST TRANSCODER

OPTIONS

+XC2HD - Adds two transcoding licenses



The BBG-1090-TRX-MPEG provides a compact form-factor standalone offering a powerful transcoding solution combining IPTV, professional broadcast, enterprise video delivery, and streaming video environments, making it ideally suited for content repurposing, edge transcoding, and video distribution network bandwidth optimization.

The BBG-1090-TRX-MPEG is a full-featured quad-channel video transcoder using the latest advances in video compression technology to ensure excellent video quality at low bit rates. Simultaneous support of DVB-ASI, broadcast over IP, MPEG-DASH Streaming, and HTTP Live Streaming allows content to be freely distributed over virtually any video network.

The BBG-1090-TRX-MPEG provides transcoding of two video services (channels) using either MPEG-2 or MPEG-4 AVC codecs in SD format and the output of MPEG-1 Layer II services. The single program can be outputted over ASI and IP interfaces individually or simultaneously. License options allow easy scalability via easy to install software uploads without removing or powering-down the device. DashBoard™ remote control allows easy centralized control and monitoring access.

FEATURES

Dual-channel multi-standard HD/SD transcoding standard – scalable for additional transcoding using software licenses as simple downloads

Supports MPEG-1 Layer II, AAC, and Dolby® AC-3 audio inputs

Full, future-proof “any-to-any” multi-standard codec support – adapts services from both MPEG-2 and MPEG-4 AVC systems

Compact self-contained form factor with built-in AC power supply

IP transmission using unicast or multicast

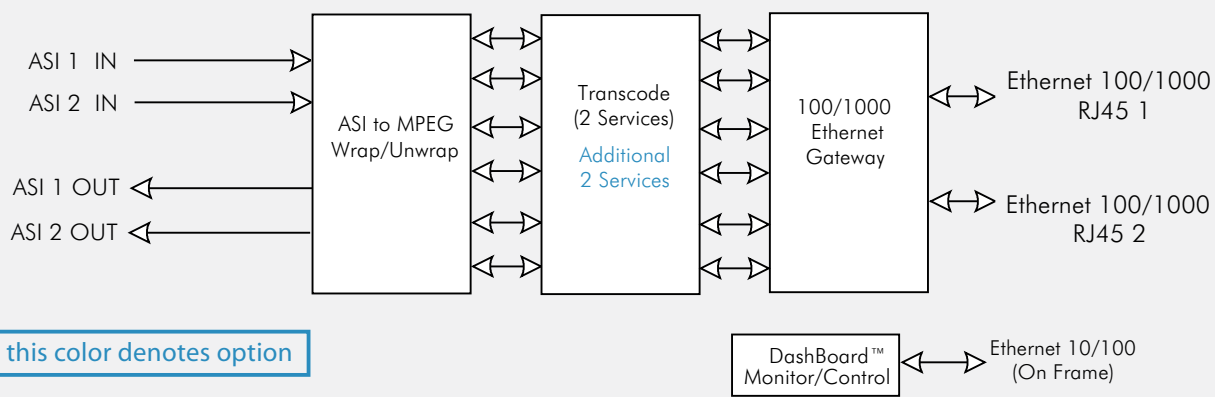
Gigabit Ethernet and DVB-ASI input/outputs

Audio pass-through

VBI and closed-captioning pass-through

Easy integration and control/monitoring via DashBoard remote control

Five year warranty



9990-TRX-MPEG

BBG-1090-TRX-MPEG

SPECIFICATIONS

Power

100-250 VAC, 47-63 Hz, 15W

Inputs/Outputs

2x 100/1000Base-T RJ-45 ports, auto-negotiate or fixed speed

2x DVB-ASI input ports, BNC 75Ω

2x DVB-ASI output ports, BNC 75Ω

213Mbit/s maximum ASI TS bit-rate per port

Ethernet

Number of Ports: 4

Cable Type: Standard straight-thru CAT-5e

Connector Type: RJ-45

Network Transport Protocols

UDP/IP (Unicast and Multicast)

RTP/IP (Unicast and Multicast)

RTMP (Flash)

HTTP Live Streaming (HLS): populates an external web server through FTP or SFTP

Direct HTTP Streaming: encodes directly to an HTTP connection. Automatically generates web pages with a video window for all supported modes (VLC plug in required)

Transcode Modes

Multi-codec capable

MPEG-2 to MPEG-4 AVC

MPEG-4 AVC to MPEG-2

SD/HD MPEG-2 to MPEG-2 and AVC to AVC re-encode

- format conversion

rate reduction

Video Processing

Integrated downconversion

- HD to SD

- Sub-SD resolutions

Adaptive deinterlacer

Frame rate reduction

AFD handling

Closed captions and VBI passthrough

Video Transcoding

Input:

MPEG-4 AVC HP@L4.0, HP@L4.2 (HD)

MPEG-4 AVC MP@L3.0 (SD)

MPEG-2 HP@HL (HD)

MPEG-2 MP@ML (SD)

Output:

MPEG-4 AVC HP@L4.0, HP@L4.2 (HD)

MPEG-4 AVC MP@L3.0 (SD)

MPEG-2 HP@HL (HD)

MPEG-2 MP@ML (SD)

CBR & VBR

1.5Mbps to 10 Mbps (profile dependent)

Video Formats

Input:

1080 x 1920p 60/50

1080 x 1920/1440i 25 29.97/30

720 x 1280/960 50/59.94

960 x 540 25/29.97

480 x 720/704/640/528 29.97

576 x 720/704/640/528 25

640x480, 480x270, 320x240, 320x180

Output:

1080 x 1920p 60/50

1080 x 1920/1440i 25 29.97/30

720 x 1280/960 50/59.94

960 x 540 25/29.97

480 x 720/704/640/528 29.97

576 x 720/704/640/528 25

640x480, 480x270, 320x240, 320x180

29.97, 25, 15, 12.5, 7.5, 6.25 frames/sec

Audio Transcoding

Input:

MPEG-1 layer II stereo

MPEG-4 AAC-LC stereo and 5.1

MPEG-4 HE-AAC 5.1

Dolby AC-3 stereo, 5.1, 7.1

Output:

MPEG-1 layer II

MPEG-4 AAC-LC

Pass-through

Conversion:

5.1 -> 5.1, 2.0

Management

10/100/1000Base-T Ethernet (RJ-45)

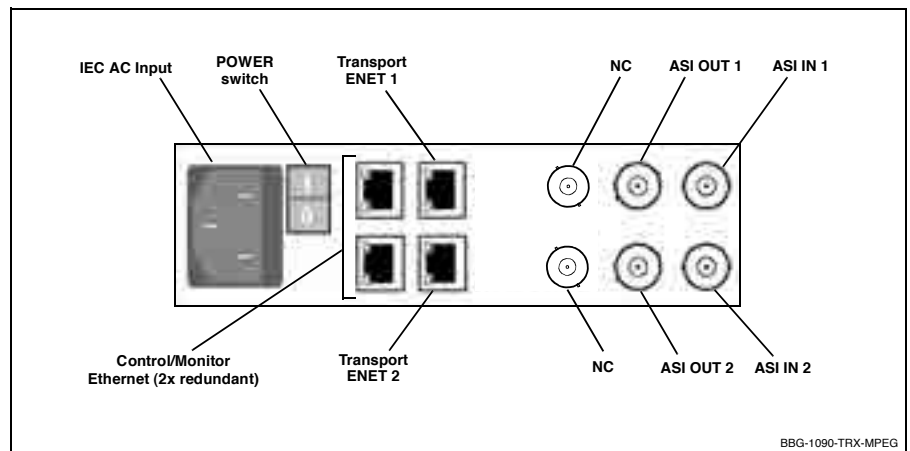
Configuration import/export

Visual fault indicator

SNMP v1,v2

Datasafe™ automated card configuration

Accurate bit rate control



ORDERING INFORMATION

BBG-1090-TRX-MPEG Multi-Standard Modular Broadcast Transcoder

+TRX2-SA Add Transcoding License. Adds transcoding for two additional services

TRAY 1 RU Rack Mount Tray (supports up to 3 modular chassis units)

BBG-4490-CWDM)) MODULAR MULTI-CHANNEL FIBER OPTICAL MULTIPLEXERS/DE-MULTIPLEXERS

OPTIONS

RMT Rack Mounting Panel; 3-device. Provides 1RU rack mounting for up to three BBG-4490-CWDM-4A, 4B, and/or BBG-4490-CWDM-OS.

RMD Rack Mounting Panel; 2-device. Provides 1RU rack mounting for up to two BBG-4490-CWDM-8.



The BlueBox™ BBG-4490 series of CWDM passive multiplexers (mux) / de-multiplexers (demux) offer a flexible, scalable, cost-effective solution to mux and demux up to 18 fiber channels onto a shared fiber trunk. 4 and 8-channel units are available which can be used as standalones or rack-mounted using an optional 1RU mounting panel (12, 16, and 18-channel units are rack-mounted 1RU units). Used in conjunction with our fiber EO and OE converter cards, digital video, audio, and IP can all be carried over a shared fiber trunk. Coarse Wave Division Multiplexing (CWDM) offers a cost-effective, scalable, and convenient solution for multiplexing and de-multiplexing discrete channels onto a shared fiber trunk. Each model can be used as a mux or a de-mux unit (**two units are required for a complete mux/de-mux setup**).

The BBG-4490 mux/de-mux units are available in 4, 8, 12, 16, and 18-channel versions. Epoxy-free optical paths help ensure reliability over a wide range of operating conditions. The low-loss passive devices use no external power.

)) FEATURES

Modular design allows use as a standalone or rack-mounted without a frame

Available in several connector configurations - ST, SC, LC, FC

Same models can be used either as mux or demux unit - fully bidirectional

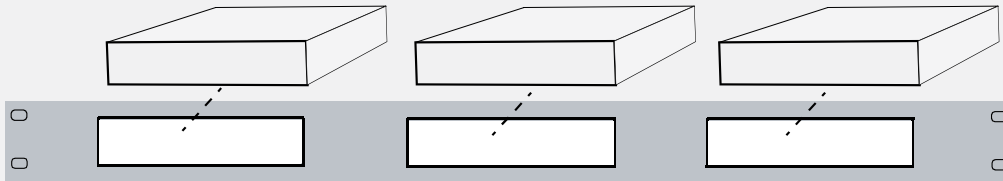
Epoxy-free optical paths help ensure reliability over a wide range of operating conditions

Fully passive design using low-loss filters. Requires no power or communications.

Five year warranty

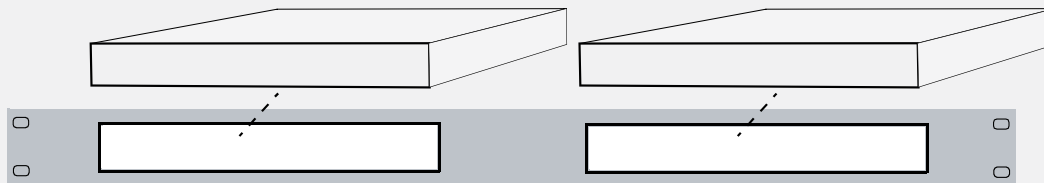
BBG-4490-CWDM-4

BBG-4490-CWDM-4 provide 4-in mux or 4-out demux which can be used as standalone, or used as 1RU triple rack-mounted using optional RMT mounting panel



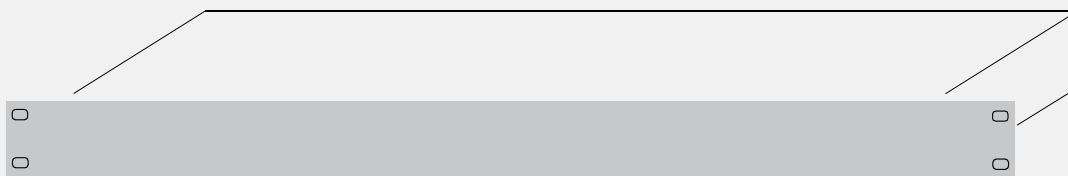
BBG-4490-CWDM-8

BBG-4490-CWDM-8 provide 8-in mux or 8-out demux which can be used as standalone, or used as 1RU dual rack-mounted using optional RMD mounting panel



BBG-4490-CWDM-12 BBG-4490-CWDM-16 BBG-4490-CWDM-18

These units (available as 12, 16, or 18-channel) provide multi-channel mux or demux and are available each as an integral 1RU unit

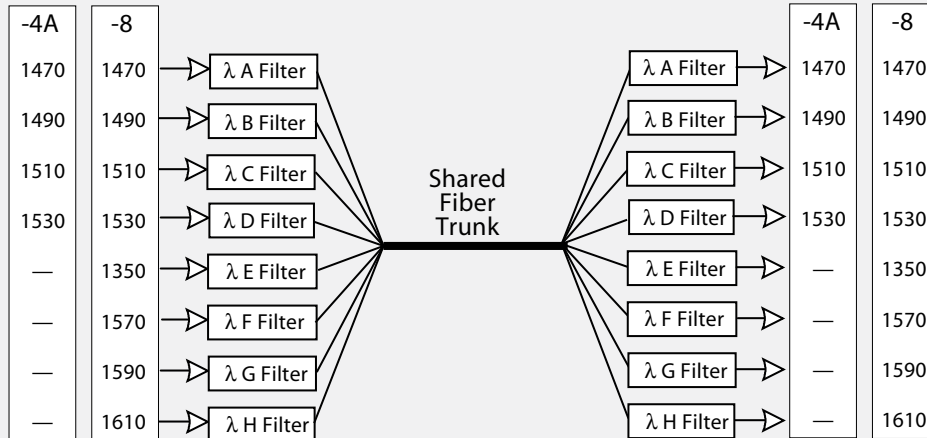




BBG-4490-CWDM

BBG-4490-CWDM-8 (as Mux)

BBG-4490-CWDM-8 (as De-Mux)



BBG-4490-CWDM offers several choices in fiber wavelength (channel) capacity, ranging from 4-channel to 18-channel (shown here are the 4- and 8-channel models; see Ordering Info that lists wavelength divisions for 12-, 16-, and 18-channel models). All units can be used as a mux or a de-mux unit. Two units (min) are required for a complete mux / de-mux setup.

SPECIFICATIONS

Filter Wavelengths

See Ordering Information

Central Wavelength Accuracy

< ± 1nm

In-band Ripple

0.5 dB

Passband Width @ 0.5 dB

>13nm

Insertion Loss

<= 3.6 dB

Adjacent Channel Isolation

>= 15 dB

Non-adjacent Channel Isolation (demux usage)

>= 40 dB

Uniformity

3 dB (max)

Polarization-dependent Loss

0.15 dB (max)

Polarization Mode Dispersion

0.1 ps (max)

Return Loss

50 dB (min)

Directivity

50 dB (min)

Temperature Stability

0.007 dB/°C (max)

Temperature Wavelength Drift

0.005 nm/°C (max)

Power Handling

300 mW (max)

Tensile Load

5N (max)

Temperature Range

0-70°C (operating)

-40 to +85°C (storage)

ORDERING INFORMATION

BBG-4490-CWDM-4A-XX 4-Channel CWDM Mux/Demux; 1470-1490-1510-1530 nm. (3 units per 1RU optional mounting panel)

BBG-4490-CWDM-4B-XX 4-Channel CWDM Mux/Demux; 1550-1570-1590-1610 nm. (3 units per 1RU optional mounting panel)

BBG-4490-CWDM-8-XX 8-Channel CWDM Mux/Demux; 1470-1490-1510-1530-1550-1570-1590-1610 nm. (2 units per 1RU optional mounting panel)

BBG-4490-CWDM-12-XX 12-Channel CWDM Mux/Demux; 1270-1290-1310-1330-1470-1490-1510-1530-1550-1570-1590-1610 nm. (1RU unit)

BBG-4490-CWDM-16-XX 16-Channel CWDM Mux/Demux; 1310-1330-1350-1370-1390-1410-1430-1450-1470-1490-1510-1530-1550-1570-1590-1610 nm. (1RU unit)

BBG-4490-CWDM-18-XX 16-Channel CWDM Mux/Demux; 1270-1290-1310-1330-1350-1370-1390-1410-1430-1450-1470-1490-1510-1530-1550-1570-1590-1610 nm. (1RU unit)

BBG-4490-CWDM-OS-1X2-SC 1x2 50/50 Optical Splitter. SC connectors only. <3.5 dBm insertion loss. (3 units per 1RU optional mounting panel)

RMT Rack Mounting Panel; 3-device. Provides 1RU rack mounting for up to three BBG-4490-CWDM-4A, 4B, and/or BBG-4490-CWDM-OS.

RMD Rack Mounting Panel; 2-device. Provides 1RU rack mounting for up to two BBG-4490-CWDM-8.

Note: All units can be used as multiplexer or de-multiplexer. Two units are required for a complete mux-de-mux setup. Where operating wavelength differences are specified, make certain mux/demux pair is ordered with correspondingly matched wavelengths.

Note: Add fiber connector suffix to part numbers to specify fiber connection type (LC, ST, SC, FC). (For example, BBG-4490-CWDM-4A-XX fitted with LC connectors is ordered as BBG-4490-CWDM-4A-LC".)

THROW DOWN! WITH THE BLUE BOX

COMPACT CONVERSION. PEAK PERFORMANCE.

Delivering excellent performance and a small footprint, Blue Box low-cost modular boxes provide 3G/HD/SD-SDI, HDMI, and analog conversions with audio embed / de-embed, as well as models offering coax/fiber conversions. Blue Box is backed by a five-year warranty.

Blue Box Group™

Low cost modular boxes;
excellent performance

3G (1080p59.94/50)
support for HDMI models

Analog Audio embed/de-embed

Backed by 5 year warranty

Small footprint



Blue Box Group™ models include:

- BBG-S-TO-H - 3G/HD/SD-SDI to HDMI with de-embedder
- BBG-H-TO-S - SDI - HDMI to 3G/HD/SD-SDI with embedder
- BBG-S-TO-A - HD/SD-SDI to HD/SD analog component/composite with audio de-embedder
- BBG-A-TO-S - Analog component/composite with audio embedder
- BBG-EMDE-AES - 3G/HD/SD-SDI 16-Channel AES Audio Embedder/De-Embedder
- BBG-EM-AA - 3G/HD/SD-SDI 8-Channel Analog Audio Embedder
- BBG-DE-AA - 3G/HD/SD-SDI 8-Channel Analog Audio DE-Embedder
- BBG-OE - 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Receiver
- BBG-2OE - 3G/HD/SD-SDI / ASI / MADI Dual Fiber Optic Dual Transport Receiver
- BBG-EO - 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Transmitter
- BBG-2EO - 3G/HD/SD-SDI / ASI / MADI Dual Fiber Optic Dual Transport Transmitter
- BBG-E00E - 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Transceiver
- BBG-OEO - 3G/HD/SD-SDI / ASI / MADI Fiber Optic Transport Regenerator
- BBG-F-TO-H - 3G/HD/SD-SDI Fiber Optic-To-HDMI Converter
- BBG-H-TO-F - 3G/HD/SD-SDI HDMI-To-Fiber Optic Converter



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» BLUE BOX COMPACT CONVERTER UNITS



Cobalt introduces Blue Box – our all-new line of interface converter boxes that not only offer excellent performance, but also excel to a new level of ease of use and installation practicality.

Many Blue Box models can power directly via USB to get its power from video monitors or other equipment.

» FEATURES

3G (1080p5994/50) conversion on HDMI models

Audio embed/de-embed for analog audio interfaces.

Convenient, compact form and fit provides secure and uncluttered affixing to monitors and cameras

Rugged construction backed with a five-year warranty

» BLUE BOX UNITS AVAILABLE IN THE FOLLOWING INTERFACE PACKAGES

Blue Box HDMI-To-SDI HDMI-to-3G/HD/SD-SDI with Audio Embedder

Blue Box SDI-To-HDMI 3G/HD/SD-SDI-to-HDMI with Audio De-Embedder

Blue Box AES Audio Embedder/De-Embedder 3G/HD/SD-SDI 16-Channel AES Audio Embedder/De-Embedder

Blue Box Analog Audio Embedder 3G/HD/SDI 8-Channel Audio Embedder

Blue Box Fiber-To-Coax 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Receiver

Blue Box Dual Fiber-To-Coax 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Dual Transport Receiver

Blue Box Coax-To-Fiber 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Transmitter

Blue Box Dual Coax-To-Fiber 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Dual Transport Transmitter

Blue Box SDI-To-Analog HD/SD-SDI-to-HD/SD Analog Component/Composite with Audio De-Embedder

Blue Box Analog-To-SDI HD/SD Analog Component/Composite-to-HD/SD-SDI with Audio Embedder

Blue Box Analog Audio De-Embedder 3G/HD/SDI 8-Channel Analog Audio De-Embedder

Blue Box Coax/Fiber Transceiver 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Transceiver

Blue Box Fiber Regenerator 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Regenerator

Blue Box Fiber-To-HDMI 3G/HD/SD-SDI Fiber Optic-To-HDMI Converter

Blue Box HDMI-To-Fiber 3G/HD/SD-SDI HDMI-To-Fiber Optic Converter



BBG-H-TO-S » HDMI-TO-3G/HD/SD-SDI WITH AUDIO EMBEDDER



Blue Box offers excellent performance, and excels to a new level of ease of use and installation practicality.

Designed to power from associated equipment, Blue Box provides for a neater, more physically secure and dependable installation than with other interface boxes. Blue Box can power directly via USB to get its power from video monitors or other equipment.

Blue Box H-to-S provides true 3G and HD conversions from HDMI to SMPTE 424M, 292M, or 259M. The HDMI input can also receive and convert DVI-D sources (limited to SMPTE HD formats).

Embedded audio on the 2x SDI output can be sourced from the HDMI input (channels 1-8) or from a line-level analog audio pair input. Along with the analog audio embedding offered by BBG H-to-S, this allows an SDI output with embedded audio from DVI-D video sources.

» FEATURES

Powers directly from host equipment USB jack and/or AC adapter, with simultaneous use providing power redundancy

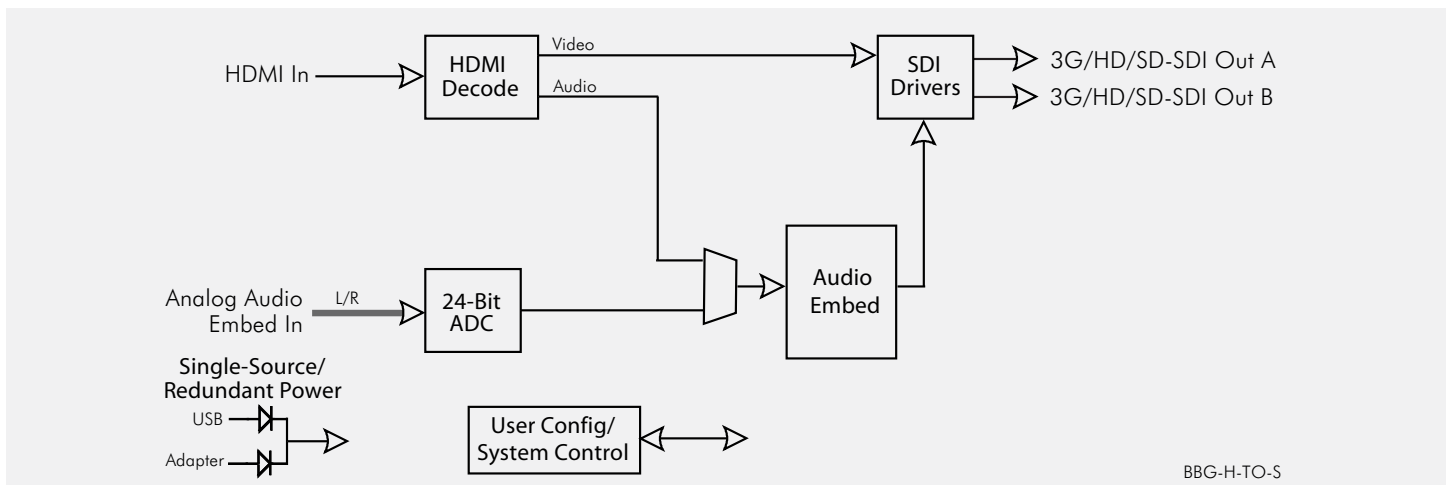
5.1-channel embedding from HDMI audio. Stereo embedding from stereo analog audio input pair.

Direct conversion from HDMI to SMPTE 259M, 292M and 424M SDI. Accepts DVI-D input sources with conversion to coax SDI.

Small rugged portable standalone package ideal for portable installations. Compact size and low weight design easily affixes directly to camera or host device chassis.

2x SDI DA output

Rugged construction backed with a five-year warranty



BBG-H-TO-S

» SPECIFICATIONS

Power
5-16 VDC, 2.4 W (AC adapter included)

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Standards/Data Rates Supported
SMPTE 424M, 292M, 259M

Inputs
- HDMI (HDMI 1.4a compliant). DVI-D compliant input (limited to SMPTE HD formats).
- (2) analog audio (unbalanced consumer RCA)

Outputs
(2) SDI (75Ω BNCs)

Audio conversion format
48 kHz sampling, 24-bit
8-ch HDMI to SDI groups 1 and 2

Dimensions
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-H-TO-S HDMI-to-3G/HD/SD-SDI with Audio Embedder Converter Unit



BBG-S-TO-H » 3G/HD/SD-SDI-TO-HDMI WITH AUDIO DE-EMBEDDER



Blue Box offers excellent performance, and excels to a new level of ease of use and installation practicality.

Blue Box can power directly via USB to get its power from video monitors or other equipment. Blue Box S-to-H provides direct conversion from SMPTE 259M, 292M and 424M SDI to HDMI. Easy to use DIP switch sets YPbPr or RGB colorspace and HDMI or DVI output modes.

Full group 1/2 conversion to HDMI audio is provided, with user control of C/LFE channel line-up as well as group 1/2 selected audio pair de-embed to a stereo line-level audio output pair.

» FEATURES

Powers directly from host equipment USB jack and/or AC adapter, with simultaneous use providing power redundancy

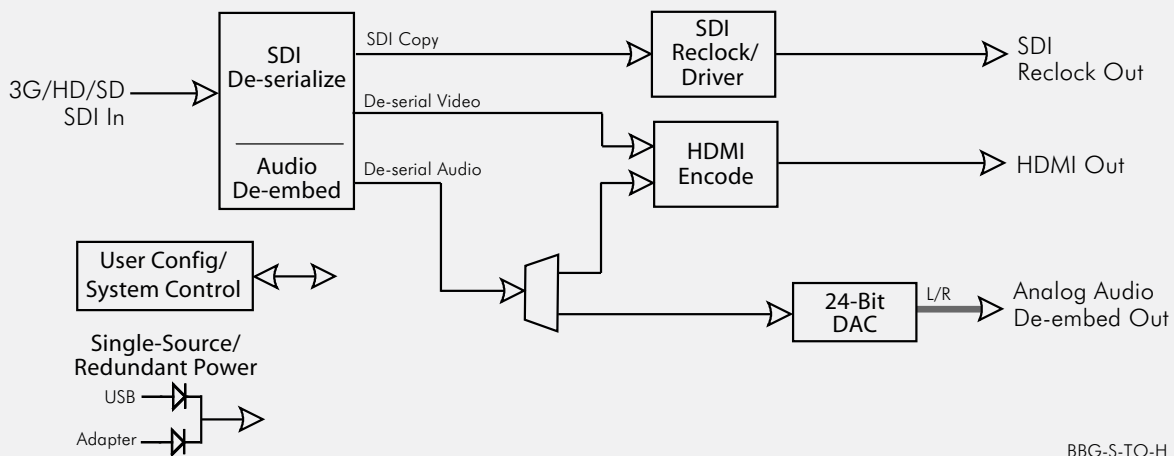
Full 5.1 channel audio conversion to HDMI audio with selectable C/LFE line-up control. Audio de-embed of selected group 1/2 pair to analog audio output pair.

Selectable YPbPr or RGB colorspace and HDMI/DVI output modes

Small rugged portable standalone package ideal for portable installations. Compact size and low weight design easily affixes directly to camera or host device chassis.

SDI input copy output allows converter to provide SDI pass-thru

Rugged construction backed with a five-year warranty



BBG-S-TO-H

» SPECIFICATIONS

Standards/Data Rates Supported
SMPTE 424M, 292M, 259M

Power
5-16 VDC, 2.4 W (AC adapter included)

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Inputs
SDI (75Ω BNC)

Outputs
- HDMI (HDMI 1.4 compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats).
- SDI reclocked input copy (75Ω BNC)
- (2) analog audio (unbalanced consumer RCA)

Audio conversion format
48 kHz sampling, 24-bit
SDI groups 1/2 to HDMI Ch 1-8 (with user-selectable C/LFE line-up)

Dimensions
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-S-TO-H 3G/HD/SD-SDI-to-HDMI with Audio De-Embedder Converter Unit



BBG-S-TO-A » HD/SD-SDI-TO-HD/SD ANALOG COMPONENT/COMPOSITE WITH AUDIO DE-EMBEDDER



Blue Box offers excellent performance, and excels to a new level of ease of use and installation practicality.

Designed to power from associated equipment, Blue Box provides for a neater, more physically secure and dependable installation than with other interface boxes. Blue Box can power directly via USB to get its power from video monitors or other equipment.

» FEATURES

Powers directly from host equipment USB jack and/or AC adapter, with simultaneous use providing power redundancy

Audio de-embed to analog pair from SDI input

High-quality 12-bit D/A conversion of NTSC/PAL SMPTE 259M or SMPTE 292M to YPbPr / RGB component or

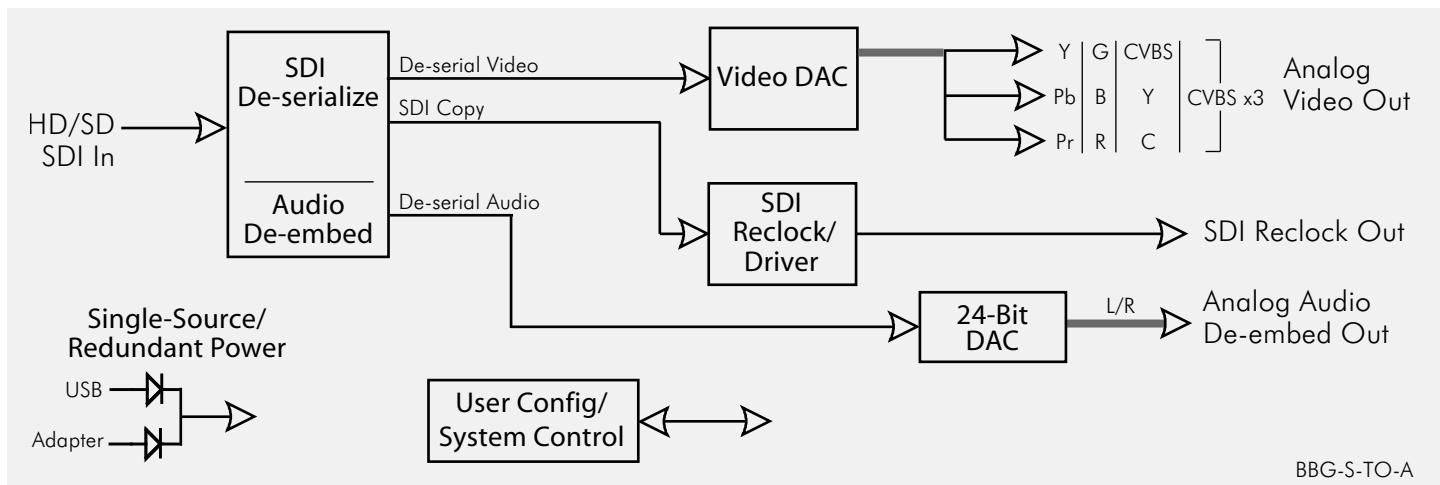
CVBS / S-Video composite video
Small rugged portable standalone package ideal for portable installations

Passes line 21 closed-captioning for SD-SDI to analog conversions

De-embedding from selectable embedded pair to stereo analog audio outputs

SDI input copy output allows converter to provide SDI pass-thru

Rugged construction backed with a five-year warranty



BBG-S-TO-A

» SPECIFICATIONS

Standards/Data Rates Supported
SMPTE 292M, 259M

Power
5-16 VDC, 2.4 W (AC adapter included)

DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Input
SDI (75Ω BNC)

Outputs
- YPbPr, RGB, Y/C, or CVBS analog video (75Ω BNCs)
- SDI reclocked input copy (75Ω BNC)
- (2) analog audio (unbalanced consumer RCA)

Audio conversion format
48 kHz sampling, 24-bit

Dimensions
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-S-TO-A HD/SD-SDI-to-HD/SD Analog Component/Composite with Audio De-Embedder Converter Unit



BBG-A-TO-S » HD/SD ANALOG COMPONENT/COMPOSITE-TO-HD/SD-SDI WITH AUDIO EMBEDDER CONVERTER UNIT



Blue Box offers excellent performance, and excels to a new level of ease of use and installation practicality.

Designed to power from associated equipment, Blue Box provides for a neater, more physically secure and dependable installation than with other interface boxes. Blue Box can power directly via USB to get its power from video monitors or other equipment.

» FEATURES

Powers directly from host equipment USB jack and/or AC adapter, with simultaneous use providing power redundancy

2-channel audio embedding

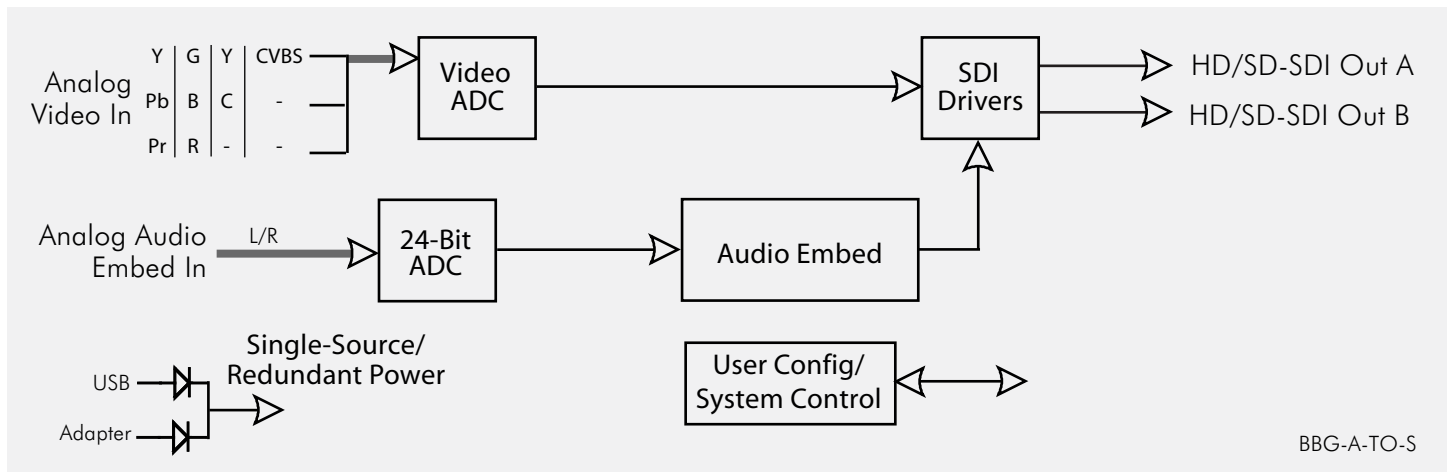
High-quality 12-bit A/D conversion of NTSC/PAL YPbPr / RGB component or S-Video / CVBS composite video to SMPTE 259M or SMPTE 292M

Small rugged portable standalone package ideal for portable installations

Passes line 21 closed-captioning for analog-to-SD-SDI conversions

2x SDI DA output

Rugged construction backed with a five-year warranty



» SPECIFICATIONS

Standards/Data Rates Supported

SMPTE 292M, 259M

Power

5-16 VDC, 2.4 W (AC adapter included)

DC Power Connectors

USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Input

- YPbPr, RGB, Y/C, CVBS analog video (75Ω BNCs)
 - (2) analog audio (unbalanced consumer RCA)

Outputs

(2) SDI (75Ω BNCs)
 Audio conversion format
 48 kHz sampling, 24-bit

Dimensions

5.5" x 3" x 1" (including connector projections)
 (139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-A-TO-S HD/SD Analog Component/Composite-to-HD/SD-SDI with Audio Embedder Converter Unit



BBG-EMDE-AES » 3G/HD/SD AES AUDIO EMBEDDER/DE-EMBEDDER



Blue Box™ offers excellent performance, and excels to a new level of ease of use and installation practicality. The BlueBox™ 3G/HD/SD AES Audio Embedder/De-Embedder provides full 16-channel embed and de-embed between AES and all four groups of embedded audio. Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with device 48 kHz timing for glitch-free embedding.

Embed / De-embed selection can be configured using the device DIP switches or can be configured using an intuitive GUI application that communicates with BBG-EMDE-AES over a PC's USB port. The GUI app allows dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

BBG-EMDE-AES75: AES-3id 75Ω (BNC) AES I/O

BBG-EMDE-AES110: AES/EBU 110Ω (XLR balanced) AES I/O

» FEATURES

8-pair (16-channel) AES support. Individual per-pair embedding or de-embedding. DB-15 connector with AES breakout provides compact footprint (models available with AES-3id BNC or AES/EBU balanced XLR connections). AES I/O can utilize direct connection from standard DB-15 connectors.

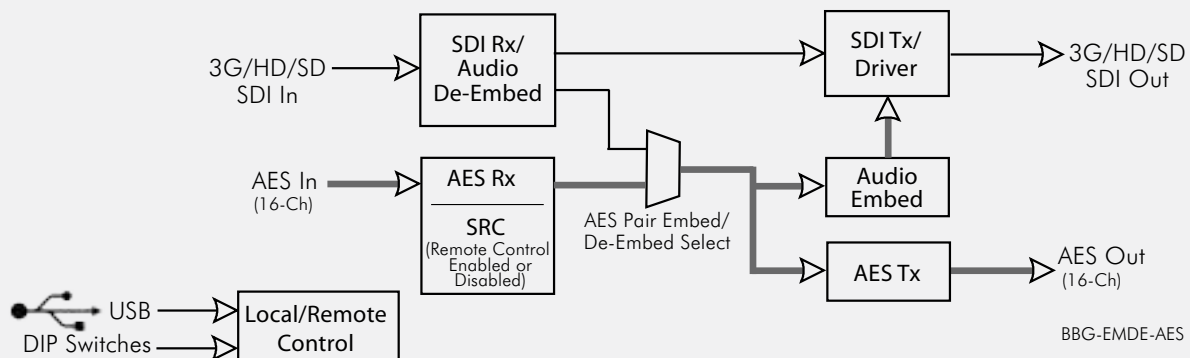
Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages

Small rugged portable standalone package ideal for portable installations. Compact size and low weight design easily affixes directly to host device chassis.

Audio embed adaptive SRC allows asynchronous 48 kHz AES audio to automatically sync with device 48 kHz timing for glitch-free embedding. SRC can be user enabled or disabled and is automatically bypassed for Dolby® embedding.

Settings configurable via unit switches or USB

Rugged construction backed with a five-year warranty



BBG-EMDE-AES

» SPECIFICATIONS

Power
5-16 VDC, <5 W (AC adapter included)

DC Power Connectors
Coaxial locking connector (for use with supplied Cobalt power adapter).

USB Port
Mini-USB (used for USB remote control connection and firmware upgrade upload to device)

Standards/Data Rates Supported
SMPTE 259M, 292M, 424M

Input/Outputs

- 3G/HD/SD-SDI In (75Ω BNC)
- 8-pair AES-3id (75Ω) (BBG-EMDE-AES75)
- 8-pair AES/EBU (110Ω BALANCED) (BBG-EMDE-AES110)
- AES I/O via DB-15 connector and AES BNC breakout adapter (supplied)
- 3G/HD/SD-SDI Out (75Ω BNC)

Audio conversion format
48 kHz sampling, 24-bit with adaptive SRC. Auto SRC bypass for Dolby® embedding. SRC user enable/disable manual control.

Dimensions
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-EMDE-AES75 3G/HD/SD AES Audio Embedder/De-Embedder; AES-3id 75Ω (BNC) AES I/O

BBG-EMDE-AES110 3G/HD/SD AES Audio Embedder/De-Embedder; AES/EBU 110Ω (XLR balanced) AES I/O

Note: The USB GUI application available for BBG-EMDE-AES is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1



BBG-EM-AA » 3G/HD/SD ANALOG AUDIO EMBEDDER



Blue Box™ offers excellent performance, and excels to a new level of ease of use and installation practicality. The Blue Box™ 3G/HD/SD Analog Audio Embedder provides embedding from professional balanced audio at pro 24 dBu to 0 dBFS to levels using full 24-bit conversion.

Embed selection can be configured using the device DIP switches or can be configured using an intuitive GUI application that communicates with BBG-EM-AA over a PC's USB port. The GUI app allows dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

» FEATURES

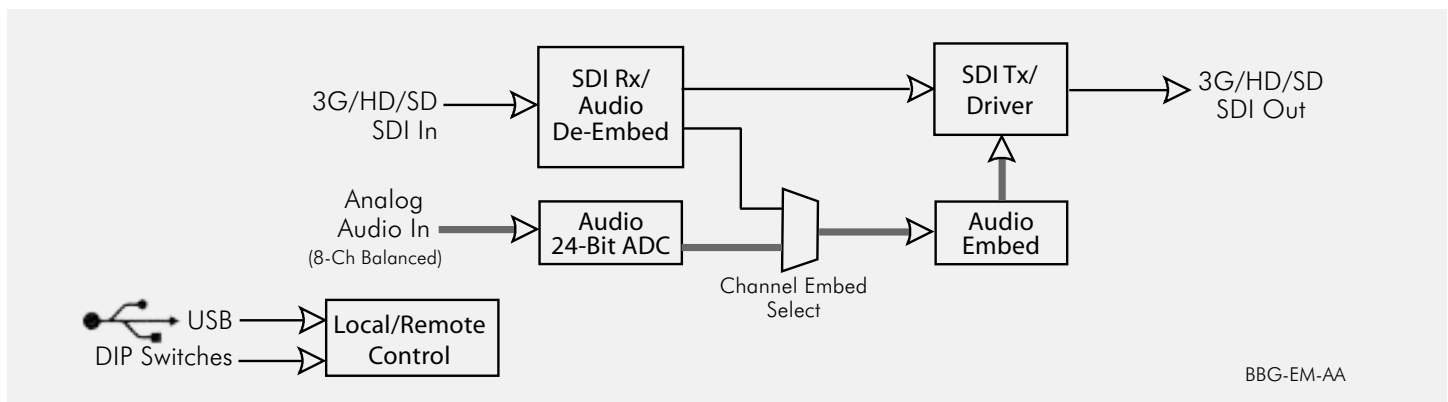
Eight balanced analog audio inputs with user-selectable direct embedding to groups 1 thru 4. DB-25 connector with XLR breakout provides compact footprint. Balanced analog audio inputs can utilize direct connection from standard DB-25 connectors.

Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages.

Balanced audio embed with full 24 dBu-to-0 dBFS 24-bit conversion.

Small rugged portable standalone package ideal for portable installations. Compact size and low weight design easily affixes directly to host device chassis.

Rugged construction backed with a five-year warranty



» SPECIFICATIONS

Power
5-16 VDC, <5 W (AC adapter included)

DC Power Connectors
Coaxial locking connector (for use with supplied Cobalt power adapter).

USB Port
Mini-USB (used for USB remote control connection and firmware upgrade upload to device)

Standards/Data Rates Supported
SMPTE 259M, 292M, 424M

Input/Outputs

- 3G/HD/SD-SDI In (75Ω BNC)
- 8-channel balanced analog audio input via DB-25 connector and XLR breakout adapter (supplied)
- 3G/HD/SD-SDI Out (75Ω BNC)

Audio conversion format
48 kHz sampling, 24-bit. Supports inputs up to 24 dBu

Dimensions
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-EM-AA 3G/HD/SD AES Analog Audio Embedder

Note: The USB GUI application available for BBG-EM-AA is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1



BBG-DE-AA » 3G/HD/SD ANALOG AUDIO DE-EMBEDDER



Blue Box™ offers excellent performance, and excels to a new level of ease of use and installation practicality. The Blue Box™ 3G/HD/SD Analog Audio De-Embedder provides de-embedding to professional balanced audio at 0 dBFS to pro 24 dBu levels using full 24-bit conversion.

De-embed selection can be configured using the device DIP switches or can be configured using an intuitive GUI application that communicates with BBG-DE-AA over a PC's USB port. The GUI app allows dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages. When configured using the GUI app, the USB connection can be removed with all settings held in non-volatile device memory.

» FEATURES

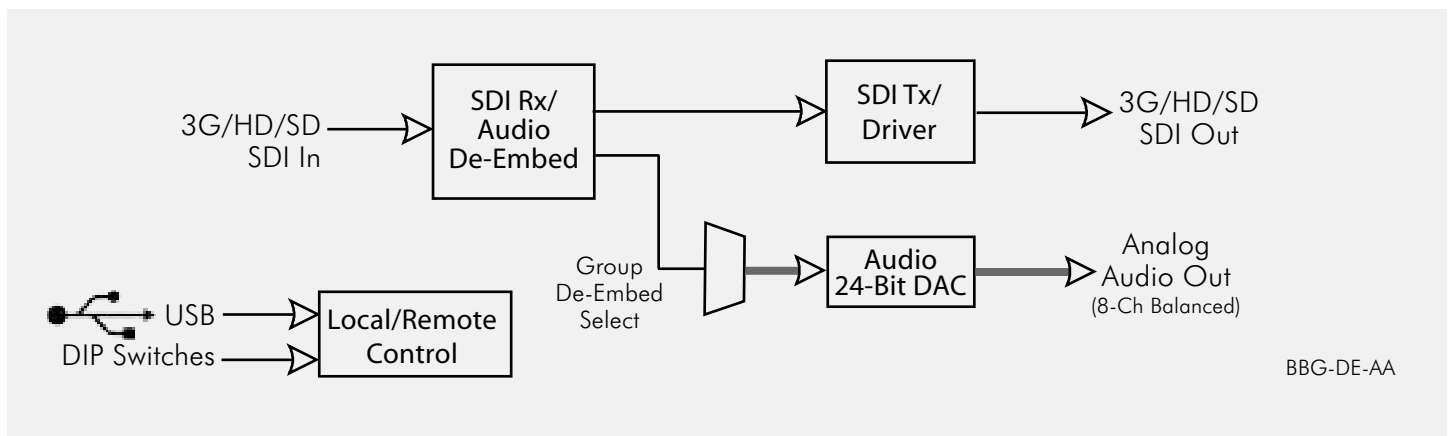
Eight balanced analog audio outputs with user-selectable direct de-embedding of groups 1 thru 4. DB-25 connector with XLR breakout provides compact footprint. Balanced analog audio outputs can utilize direct connection from standard DB-25 connectors.

Configurable using device DIP switches or USB GUI remote control offering dynamic configuration control, status display, audio meters, tone generators, and other advanced control functions not commonly found on "throwdown" packages.

Balanced audio de-embed with full 0 dBFS to 24 dBu 24-bit conversion.

Small rugged portable standalone package ideal for portable installations. Compact size and low weight design easily affixes directly to host device chassis.

Rugged construction backed with a five-year warranty



» SPECIFICATIONS

Power
5-16 VDC, <5 W (AC adapter included)

DC Power Connectors
Coaxial locking connector (for use with supplied Cobalt power adapter).

USB Port
Mini-USB (used for USB remote control connection and firmware upgrade upload to device)

Standards/Data Rates Supported
SMPTE 259M, 292M, 424M

Input/Outputs

- 3G/HD/SD-SDI In (75Ω BNC)
- 8-channel balanced analog audio output via DB-25 connector and XLR breakout adapter (supplied)
- 3G/HD/SD-SDI Out (75Ω BNC)

Audio conversion format
48 kHz sampling, 24-bit. Supports outputs up to 24 dBu

Dimensions
5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-DE-AA 3G/HD/SD Analog Audio De-Embedder

Note: The USB GUI application available for BBG-DE-AA is a free download (Windows Security Certified) that can be downloaded from our Support web page. Instructions for downloading and using the app are included in product documentation. The application is not required for device usage where only DIP switch configuration is desired.

Currently, this application is available for only the following operating systems:

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1



BBG-F-TO-H » 3G/HD/SD-SDI FIBER OPTIC-TO-HDMI CONVERTER

The new Blue Box Fiber-To-HDMI (BBG F-to-H) throw-down converter unit is a new part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG F-to-H offers a compact throwdown unit that provides direct fiber-to-HDMI conversion and much more.

The flexible built-in crosspoint and flexible I/O allows BBG F-to-H to also act as a fiber regen while providing an HDMI output. The HDMI output can be set to instead provide a DVI-D output directly compatible with computer monitors. The BBG F-to-H also can receive a coax SDI input (SMPTE 259M, 292M, and 424M) and in turn provide an HDMI and a fiber output. BBG F-to-H can also provide a coax SDI output while converting fiber to HDMI. A convenience stereo analog audio de-embed output is also provided.

» FEATURES

Flexible crosspoint and multiple inputs/outputs provide fiber-to-HDMI, SDI-to-fiber, and fiber regen conversions. HDMI output can be set as DVI-D for direct connection to computer monitors.

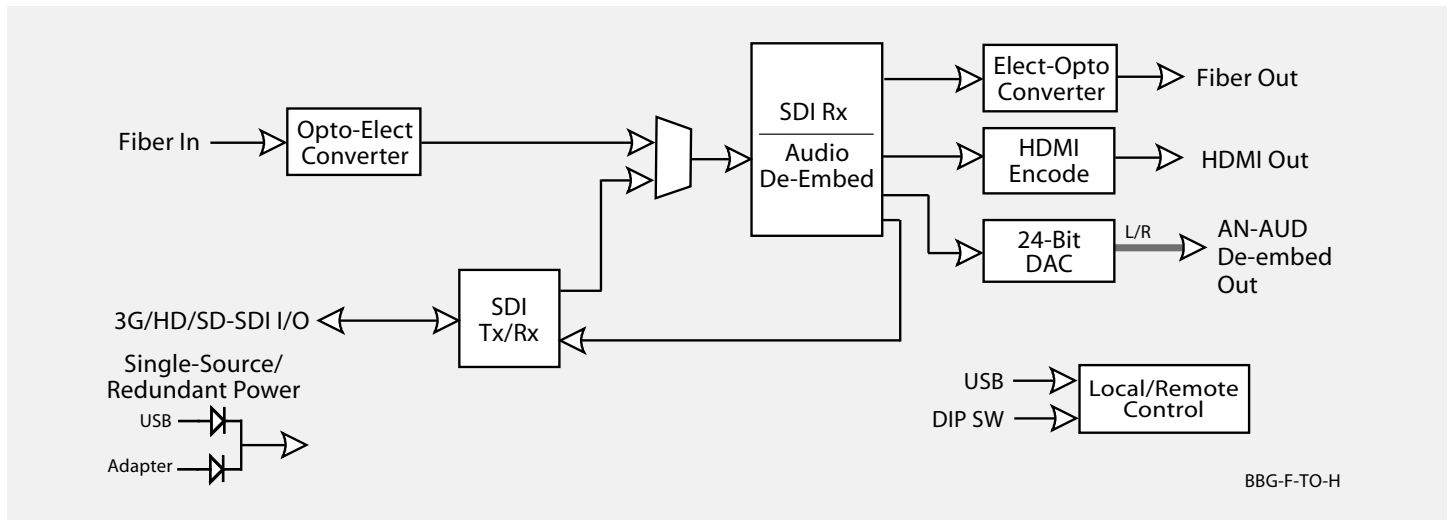
Direct conversion to HDMI from SMPTE 259M, 292M and 424M SDI.

Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.

Compact size and low weight design easily affixes directly to camera or host device chassis

Singlemode fiber link distance >10 km (3Gbps), >20 km (1.5Gbps), and >35 km (270Mbps). Multimode typically > 200 m.

Rugged construction backed with a five-year warranty



» SPECIFICATIONS

Standards supported

SMPTE 259M, 292M, 424M

Inputs/Outputs

- (1) Fiber input. FC, ST, or LC connectors per ordered configuration (see Ordering Info).
- (1) Fiber regen output. FC, ST, or LC connectors per ordered configuration (see Ordering Info).
- (1) SDI I/O (mode user selectable)
- (1) HDMI output (HDMI 1.4a compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats).

Stereo analog audio out (L/R unbalanced pair via 3.5mm TRS jack)

Audio conversion format

48 kHz sampling, 24-bit

8-Ch HDMI to SDI groups 1 and 2

Power Source

Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included)

Power

5-16 VDC, 2.4 W

DC Power Connectors

USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Dimensions (WxHxD)

5.5" x 3" x 1" (including connector projections)

(139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-F-TO-H-FC 3G/HD/SD-SDI Fiber Optic-to-HDMI Converter (Type FC fiber connector)

BBG-F-TO-H-LC 3G/HD/SD-SDI Fiber Optic-to-HDMI Converter (Type LC fiber connector)

BBG-F-TO-H-ST 3G/HD/SD-SDI Fiber Optic-to-HDMI Converter (Type ST fiber connector)



BBG-H-TO-F » 3G/HD/SD-SDI HDMI-TO-FIBER OPTIC CONVERTER



The new Blue Box HDMI-to-Fiber (BBG H-To-F) throw-down converter unit is a new part of the Blue Box Group™ of compact, rugged, and portable converter boxes. BBG H-to-F offers a compact throwdown unit that provides direct HDMI-to-fiber conversion and much more.

BBG H-To-F also provides a 3G/HD/SD-SDI output, and also provides a stereo analog audio embed input. The HDMI input can also receive and convert DVI-D sources (limited to SMPTE HD formats). Along with the analog audio embedding offered by BBG H-To-F, this allows a fiber and coax SDI output with embedded audio from DVI-D video sources.

» FEATURES

Provides simultaneous HDMI-to-fiber and HDMI-to-coax SDI conversions. Accepts DVI-D input sources with SDI format conversions to coax and fiber SDI.

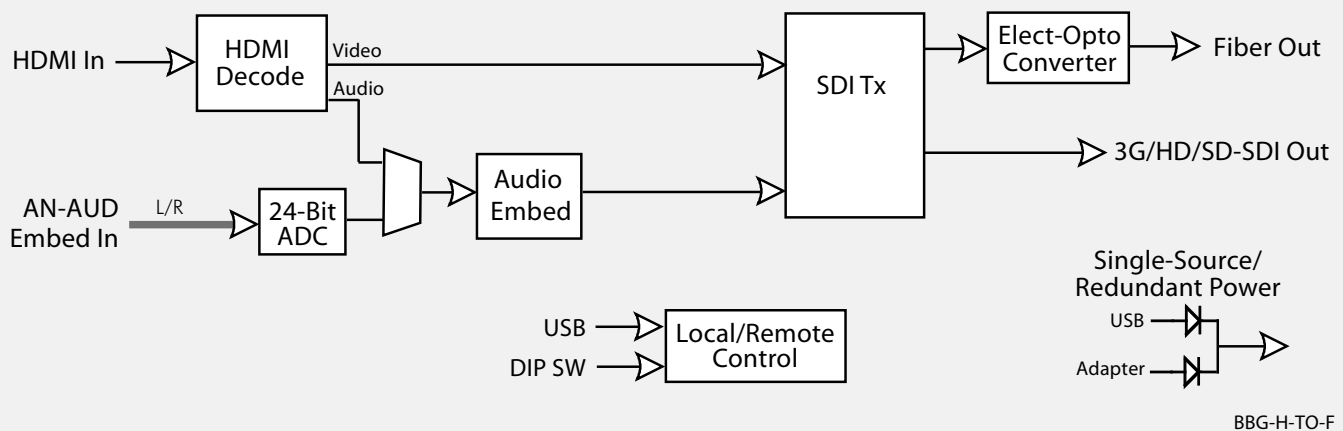
Direct conversion from HDMI to SMPTE 259M, 292M and 424M SDI.

Powers directly from host equipment USB or standard corded power adapter. USB power and corded adapter can be simultaneously used to provide redundant power sourcing.

Compact size and low weight design easily affixes directly to camera or host device chassis

Singlemode fiber link distance >10 km (3Gbps), >20 km (1.5Gbps), and >35 km (270Mbps). Multimode typically > 200 m.

Rugged construction backed with a five-year warranty



» SPECIFICATIONS

Standards supported

SMPTE 259M, 292M, 424M

Inputs/Outputs

- HDMI input (HDMI 1.4a compliant). DVI-D compliant input (limited to SMPTE HD formats).
- (1) Fiber output. FC, ST, or LC connectors per ordered configuration (see Ordering Info).
- Stereo analog audio in (L/R unbalanced pair via 3.5mm TRS jack)
- (1) SDI I/O (mode user selectable)

Audio conversion format

48 kHz sampling, 24-bit
8-Ch HDMI to SDI groups 1 and 2

Power Source

Power-sourced directly from host equipment USB port. Converter can also be powered using corded AC adapter (included)

Power

5-16 VDC, 2.4 W
DC Power Connectors
USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)

Dimensions (WxHxD)

5.5" x 3" x 1" (including connector projections)
(139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-H-TO-F-FC 3G/HD/SD-SDI HDMI-To-Fiber Optic Converter (Type FC fiber connector)

BBG-H-TO-F-ST 3G/HD/SD-SDI HDMI-To-Fiber Optic Converter (Type ST fiber connector)

BBG-H-TO-F-LC 3G/HD/SD-SDI HDMI-To-Fiber Optic Converter (Type LC fiber connector)



» BLUE BOX COMPACT CONVERTER UNITS

BBG-OE » BLUE BOX FIBER-TO-COAX RECEIVER

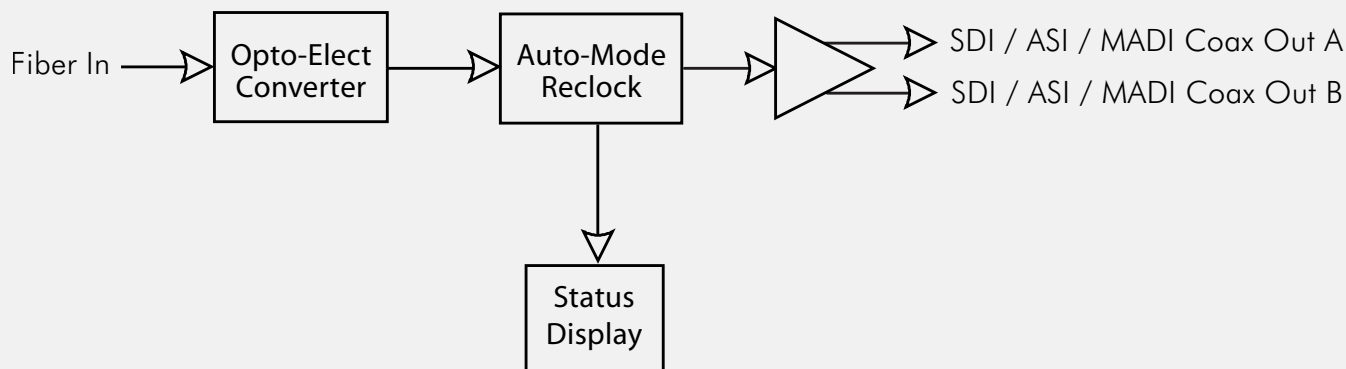
Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode reclocking. No switches to set for different payloads.

Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio

Error-free pathological support. Full compatibility with other Blue Box™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards

Small rugged portable standalone package ideal for portable installations

Powers from 5 to 16 VDC (AC adapter included). Directly compatible with low-voltage (+12 VDC) automotive/truck systems.



BBG-OE-XX

BBG-2OE » BLUE BOX DUAL FIBER-TO-COAX RECEIVER

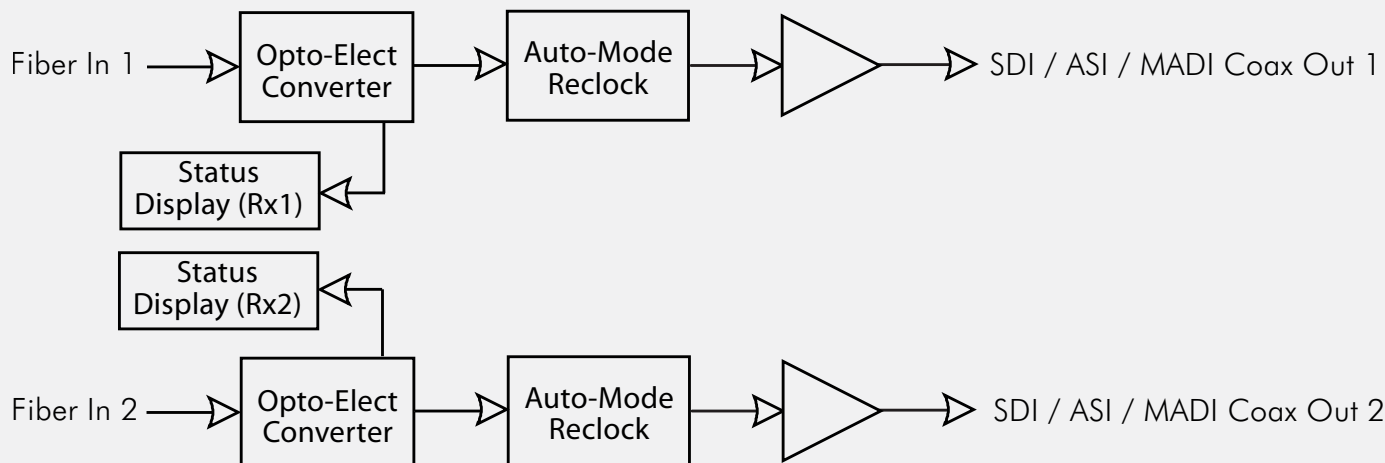
Dual independent fiber-to-coax paths – all in one easy to use throw-down box

Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode reclocking. No switches to set for different payloads.

Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio

Error-free pathological support. Full compatibility with other Blue Box™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards

Powers from 5 to 16 VDC (AC adapter included). Directly compatible with low-voltage (+12 VDC) automotive/truck systems.



BBG-2OE-XX



» BLUE BOX COMPACT CONVERTER UNITS

BBG-EO » BLUE BOX COAX-TO-FIBER TRANSMITTER

Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode reclocking. No switches to set for different payloads.

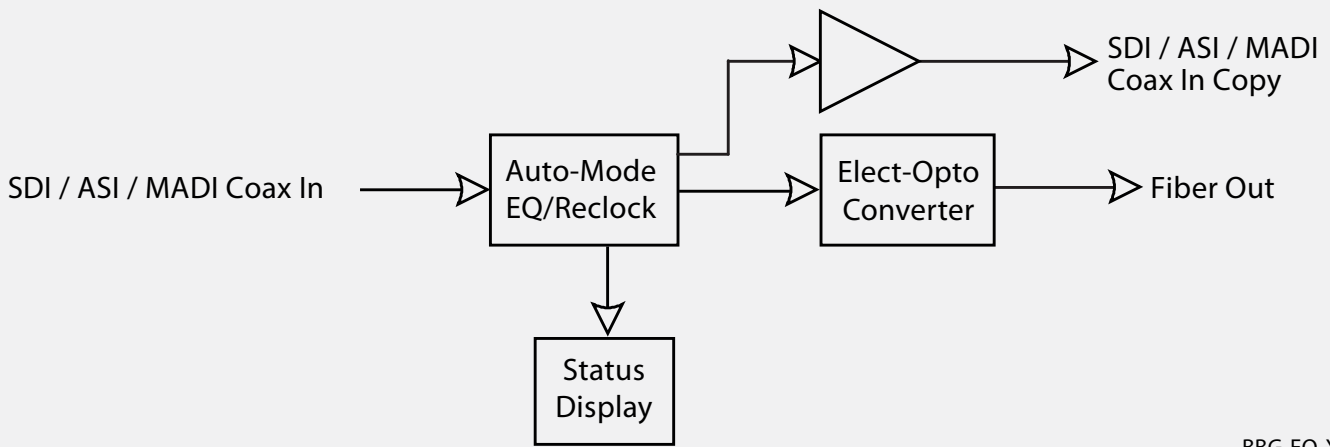
Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio

Error-free pathological support. Full compatibility with other Blue Box™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards

Auxiliary reclocked coax BNC input copy output

Small rugged portable standalone package ideal for portable installations

Powers from 5 to 16 VDC (AC adapter included). Directly compatible with low-voltage (+12 VDC) automotive/truck systems.



BBG-EO-XX

BBG-2EO » BLUE BOX DUAL COAX-TO-FIBER TRANSMITTER

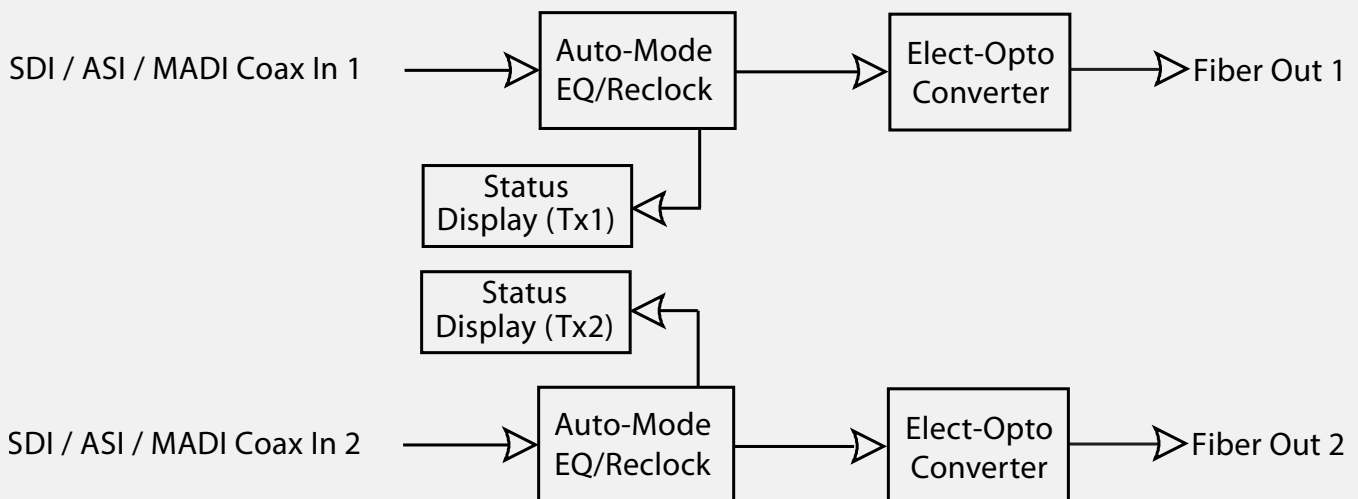
Dual independent coax-to-fiber paths – all in one easy to use throw-down box

Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode reclocking. No switches to set for different payloads.

Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio

Error-free pathological support. Full compatibility with other Blue Box™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards

Powers from 5 to 16 VDC (AC adapter included). Directly compatible with low-voltage (+12 VDC) automotive/truck systems.



BBG-2EO-XX



» BLUE BOX COMPACT CONVERTER UNITS

BBG-EOE » BLUE BOX COAX/FIBER TRANSCEIVER

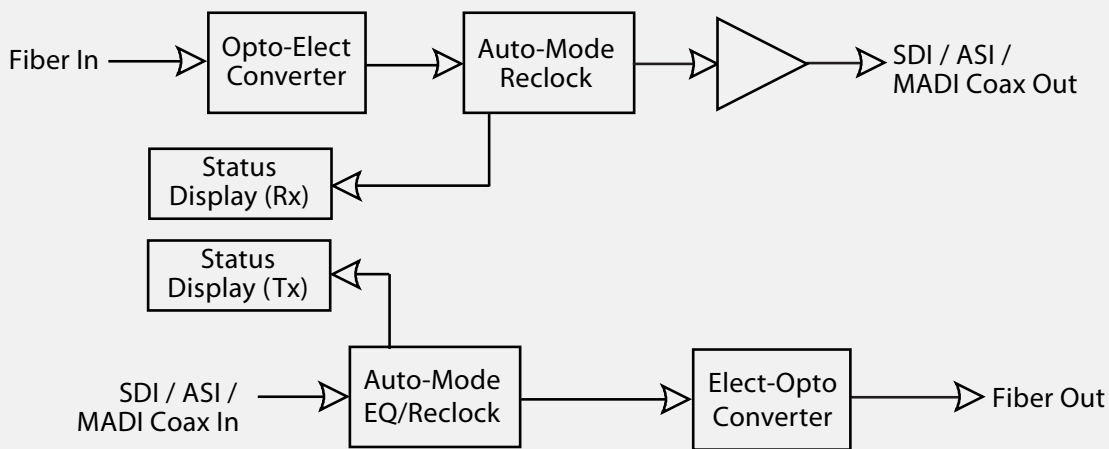
Independent companion fiber Rx and Tx paths – all in one easy to use throw-down box

Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode relocking. No switches to set for different payloads.

Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio

Error-free pathological support. Full compatibility with other Blue Box™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards

Powers from 5 to 16 VDC (AC adapter included). Directly compatible with low-voltage (+12 VDC) automotive/truck systems.



BBG-EOE-XX

BBG-OEO » BLUE BOX FIBER REGENERATOR

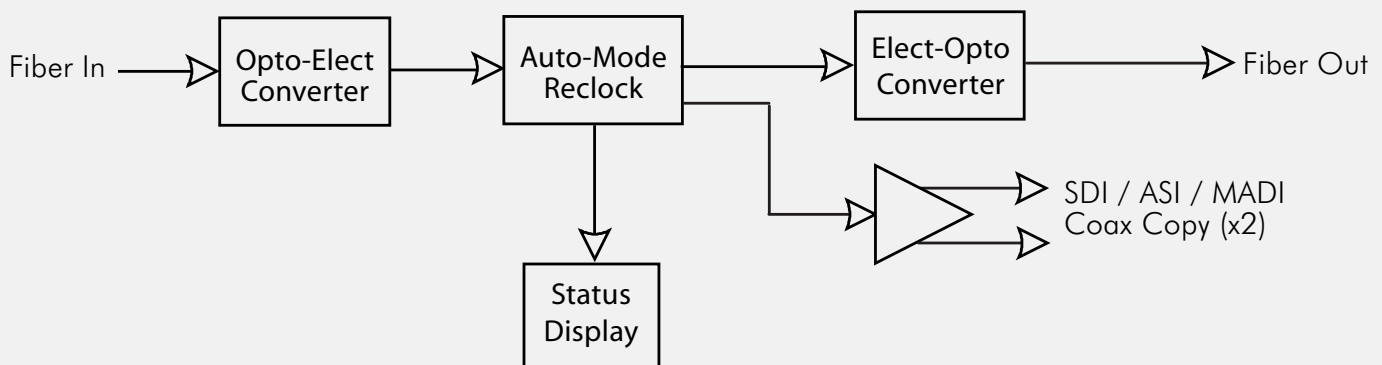
Full support of 5Mbps thru 3Gbps transport conversions, with seamless auto-mode relocking. No switches to set for different payloads.

Compatible with SMPTE 424M, 292M, 259M, 310M, M2S, DVB-ASI, and MADI audio

Dual BNC reclock/regen outputs

Error-free pathological support. Full compatibility with other Blue Box™ Coax/Fiber units and Cobalt 9400-series openGear® frame-installed fiber cards

Powers from 5 to 16 VDC (AC adapter included). Directly compatible with low-voltage (+12 VDC) automotive/truck systems.



BBG-OEO-XX



» BLUE BOX COMPACT FIBER TRANSPORT UNITS

	BBG-0E BLUE BOX FIBER-TO-COAX RECEIVER	BBG-20E BLUE BOX DUAL FIBER-TO-COAX RECEIVER	BBG-E0 BLUE BOX COAX-TO-FIBER RECEIVER	BBG-2E0 BLUE BOX DUAL COAX-TO-FIBER TRANSMITTER	BBG-E00E BLUE BOX COAX/FIBER TRANSCIEVER	BBG-0E0 BLUE BOX FIBER REGENERATOR
Specifications						
Standards/Data:	SMPTE 424M, 292M, 259M, 344M, 305M, DVB-ASI					
Rates Supported:	5Mbps to 3Gbps pathological pattern operation. (All models do not support AES-3id audio or other standards using data rates < 5Mbps.					
Inputs:	(1) Fiber FC, ST, or LC	(2) Fiber FC, ST, or LC	(1) 75Ω BNC	(2) 75Ω BNC	(1) 75Ω BNC (1) Fiber FC, ST, or LC	(1) Fiber FC, ST, or LC
Outputs:	(2) 75Ω BNC	(2) 75Ω BNC	(1) Fiber FC, ST, or LC (1) 75Ω BNC reclock copy	(2) Fiber FC, ST, or LC	(1) 75Ω BNC (1) Fiber FC, ST, or LC	(1) Fiber FC, ST, or LC (2) 75Ω BNC Regen
Power:	5 VDC – 16 VDC, <5 W (Includes Cobalt PS-4 AC Adapter)					
Dimensions (WxHxD):	5.0" x 2.9" x 1.1" (including connector projections) (127 x 74 x 28 mm)					

» ORDERING INFORMATION

BLUE BOX FIBER-TO-COAX RECEIVER

- BBG-0E-FC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Receiver (Type FC fiber connector)
- BBG-0E-ST** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Receiver (Type ST fiber connector)
- BBG-0E-LC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Receiver (Type LC fiber connector)

BLUE BOX DUAL FIBER-TO-COAX RECEIVER

- BBG-20E-FC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Dual Transport Receiver (Type FC fiber connectors)
- BBG-20E-ST** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Dual Transport Receiver (Type ST fiber connectors)
- BBG-20E-LC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Dual Transport Receiver (Type LC fiber connectors)

BLUE BOX DUAL COAX-TO-FIBER TRANSMITTER

- BBG-2E0-FC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Dual Transport Transmitter (Type FC fiber connectors)
- BBG-2E0-ST** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Dual Transport Transmitter (Type ST fiber connectors)
- BBG-2E0-LC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Dual Transport Transmitter (Type LC fiber connectors)

BLUE BOX COAX-TO-FIBER TRANSMITTER

- BBG-E0-FC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Transmitter (Type FC fiber connector)
- BBG-E0-ST** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Transmitter (Type ST fiber connector)
- BBG-E0-LC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Transmitter (Type LC fiber connector)

BLUE BOX COAX/FIBER TRANSCIEVER

- BBG-E00E-FC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Transciever (Type FC fiber connectors)
- BBG-E00E-ST** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Transciever (Type ST fiber connectors)
- BBG-E00E-LC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Transciever (Type LC fiber connectors)

BLUE BOX FIBER REGENERATOR

- BBG-0E0-FC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Regenerator (Type FC fiber connectors)
- BBG-0E0-ST** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Regenerator (Type ST fiber connectors)
- BBG-0E0-LC** 3G/HD/SD-SDI / DVB / ASI / MADI Fiber Optic Transport Regenerator (Type LC fiber connectors)

BBG-DA-3G-1x6 » 3G/HD/SD/ASI RECLOCKING DISTRIBUTION AMPLIFIER

with Bit-Rate Status



The BB-DA-3G-1x6 is an HD/SD/ASI multi-rate distribution amplifier that features HD/SD status LEDs for quick identification of the input bit rate. The unit is fully automatic and supports 424 (3 Gbit), 292 and 259M signals, and is equipped with 1 input and 6 reclocked SDI outputs. (Reclocking on 424M, 292 and 259M-C inputs, all other bit rates are non-reclocking.) The unit supports 1x3 ASI distribution using its non-inverting outputs.

The BB-DA-3G-1x6 is an HD/SD/ASI multi-rate distribution amplifier that features HD/SD status LEDs for quick identification of the input bit rate. The unit is fully automatic and supports 424 (3 Gbit), 292 and 259M signals, and is equipped with 1 input and 6 reclocked SDI outputs. (Reclocking on 424M, 292 and 259M-C inputs, all other bit rates are non-reclocking.) The unit supports 1x3 ASI distribution using its non-inverting outputs.

» FEATURES

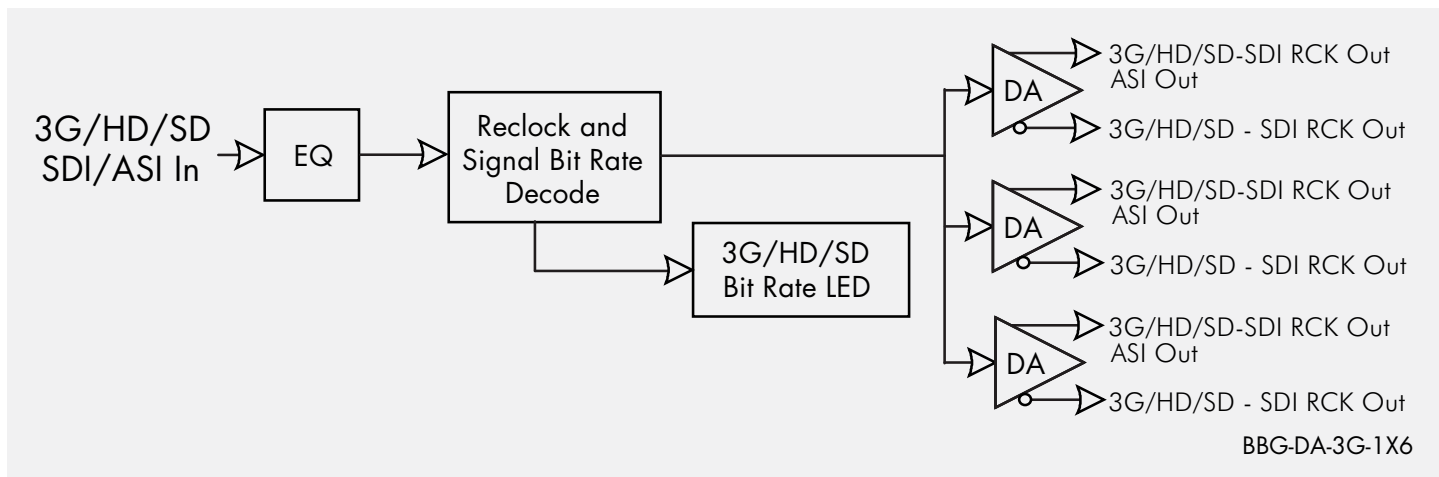
Six 3G/HD/SD equalized and reclocked outputs

1x3 ASI distribution capability

Signal type (3G/HD/SD) status display

Auto standard detect and configuration
SMPTE 424M/292/259M

Five-year warranty



» SPECIFICATIONS

Input

SMPTE 424M 3 Gbps
SMPTE 292 1.485 Gbps
SMPTE 259M 143-540 Mbps
ASI

Output

6 reclocked HD/SD-SDI
1x3 ASI distribution (using 3 non-inverting outputs)

Return loss

> 15 dB

Power

5-18 VDC @ 3.5 watts
Requires Power Supply PS11 or PS12

Size

5.5" x 3" x 1" (139 x 77 x 26 mm)

» ORDERING INFORMATION

BBG-DA-3G-1X6 3G/HD/SD Reclocking Distribution Amplifier with Bit-Rate Status (Supports SMPTE 424M - 3Gbit).

PS11 Universal Power Supply, UL/CSA, Input: 100-240 60/50 Hz, Output: 5V 1.5A

PS12 Universal Power Supply, IEC Connector, CE/UL/CSA, Input: 100-240 60/50 Hz, Output: 5V 2A (International Power Supply. Specify country of destination.)

BBG-1002-UDX » MULTI-INPUT MODULAR UP-DOWN-CROSS CONVERTER/FRAMESYNC with Auto-Changeover and Character Burn



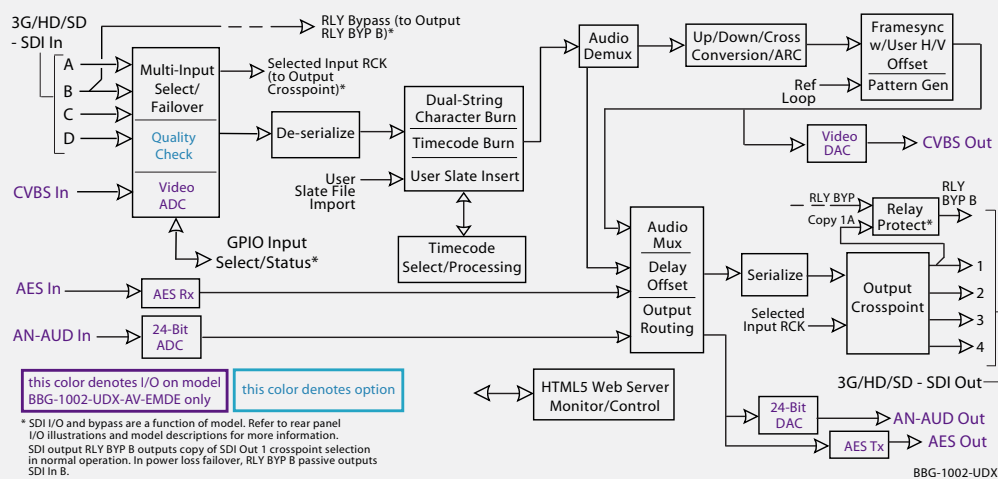
The all-new Cobalt® BBG-1002-UDX Multi-Input Modular Up-Down-Cross Converter/Framesync with Auto-Changeover and Character Burn provides a high-density standalone modular unit that offers unprecedented multi-input support, flexibility, and ease of use and integration. Multiple SDI input ports allow manual selection of input, or failover to alternate inputs (Auto-Changeover) on loss of input conditions. A Quality Check option allows failover to alternate inputs based on user-configurable subjective criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS marker. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static.

The up/down/cross convert scaler is specifically designed for broadcast video progressive and interlaced formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video. The BBG-1002-UDX-AV-EMDE model additionally provides analog video (CVBS) inputs and outputs, with AES and analog audio audio embedding and de-embedding.

The BBG-1002-UDX uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1002-UDX allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame).

» FEATURES

- Multi-input, with manual selection or intelligent Auto-Changeover failover
- Auto-Changeover can be set to invoke failover for basic input loss. Quality Check option (+QC) provides failover on subjective criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.
- Moving-box/motion insertion enable serves as a dynamic raster confidence check even when the input video image is static
- Up/Down/Cross Conversion and ARC specifically tailored for broadcast video
- Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)
- Supports import of user trouble slate graphic file for LOS failover insertion
- Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format
- Framesync with full H/V offset and manual/LOS video pattern generator. Framesync can also convert raster format between 29.97/59.94 and 30/60 formats. Rear-panel looping reference connectors.
- Full audio crosspoint with delay control available for all audio outputs
- Audio options provide loudness processing, upmixing, and Dolby decode/encode
- Video options provide CGMS support, color correction, and keying
- Web-based user interface/remote control as well as front-panel LCD local control
- Redundant power supply option
- Compact footprint - up to 3 units in a 1RU space. Optional tray provides secure captive-fastener mounting of 3 units in a 1RU tray
- Five-year warranty



* SDI I/O and bypass are a function of model. Refer to rear panel I/O illustrations and model descriptions for more information. SDI output RLY Bypass B outputs copy of SDI Out 1 crosspoint selection in normal operation. In power loss failover, RLY Bypass B passive outputs SDI In B.

BBG-1002-UDX

BBG-1002-UDX

SPECIFICATIONS

Note: Note: Inputs/outputs are a function in some cases of model. See rear panel illustrations for I/O complements offered.

Power

< 18 Watts. Power supplied by 12VDC AC adapter, universal input.

SDI Video Inputs/Outputs

- Up to (4) 75Ω BNC inputs
- Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK).
- SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
- SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
- SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
- SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

CVBS Video Input/Outputs (BBG-1002-UDX-AV-EMDE only)

- (1) 75Ω BNC input
- (1) 75Ω BNC output. CVBS can be upscaled to any supported SDI format; all SDI formats can be downconverted to CVBS.

Discrete Audio Inputs/Outputs (BBG-1002-UDX-AV-EMDE only)

- (1) AES-3id 75Ω BNC input
 - (1) AES-3id 75Ω BNC output
 - (2) Balanced analog audio inputs
 - (2) Balanced analog audio outputs.
- I/O conforms to 0 dBFS = +24 dBu.

Input Select/Auto-Changeover Failover

- Manual selection (forced) of any input via web GUI or front panel controls.
- Failover to alternate input on loss of target input. Failover invoked upon LOS and/or (with option +QC) user configurable parametric criteria such as black/frozen frame or audio silence.
 - Black frame trigger configurable for black intensity threshold and persistence time.
 - Frozen frame trigger configurable for frozen percentage difference and persistence time.
 - Audio silence trigger configurable for dBFS floor threshold and persistence time.
- Relay bypass SDI IN B to RLY BYP B upon loss of power.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Audio Processing

Full crosspoint and gain/mute/invert controls across 16-ch embedded audio SDI processed path. Embedding from analog or AES sources to any embedded channels; de-embedding to AES or analog outputs. Multi-frequency tone generator for each audio output. Master delay control; range of -33 msec to +3000 msec.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 10/100/1000 Ethernet port.

Frame Reference Input

Looping 2-BNC connection. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level" Return Loss: >35 dB up to 5.75 MHz

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections. Weight: 6 lb (2.8 kg)

ORDERING INFORMATION

BBG-1002-UDX Multi-Input Modular Up-Down-Cross Converter/Framesync with Auto-Changeover and Character Burn

BBG-1002-UDX-AV-EMDE Multi-Input Modular Up-Down-Cross Converter/Framesync with Auto-Changeover and Character Burn with CVBS analog video I/O and analog/AES audio embed/de-embed

BBG-1000-PS Redundant (n+1) Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

+ENCD Dolby® D Encoding Option

+ENCE Dolby® E Encoding Option

+DEC Dolby D/E Decoding Option

+LP51 5.1-Channel Loudness Processing Option

+LP20 2.0-Channel Loudness Processing Option

+UM 2.0-to-5.1-channel Upmixing Option

+LTC Audio LTC I/O Option

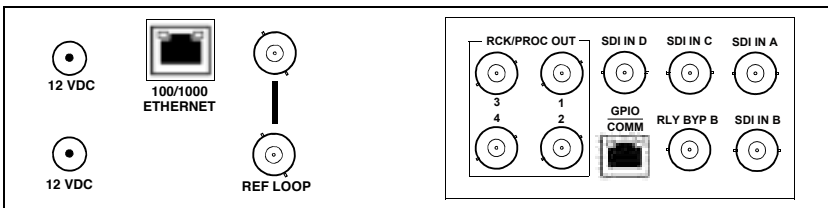
+COLOR Color Correction Option

+CGMS CGMS Support Option

+KEYER Key/Fill Keyer Option

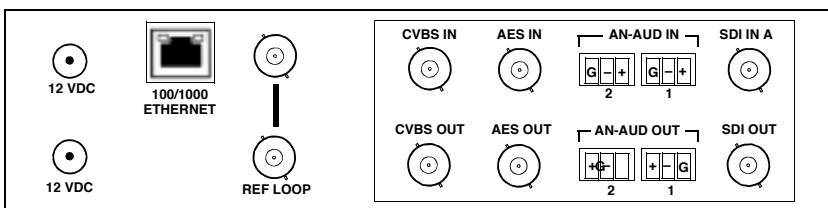
+QC Quality Check Option. Provides failover on subjective criteria such as black/frozen frame or audio silence. Threshold and hold-off are user configurable.

BBG-1002-UDX Rear Panel



Note: RCK/PROC 1 thru RCK/PROC 4 are DA outputs which can be individually set as reclocked or processed outputs of the currently-selected input. RLY BYP B is a relay-protected path which carries processed SDI out under normal conditions and passive routes SDI IN B to this BNC upon loss of power.

BBG-1002-UDX-AV-EMDE Rear Panel



BBG-1002-UDX-AAV-AES » MODULAR UP-DOWN-CROSS CONVERTER/FRAMESYNC with Universal I/O and Character Burn

The all-new Cobalt® BBG-1002-UDX-AAV-AES Modular Up-Down-Cross Converter/Framesync with Universal I/O and Character Burn provides a high-density standalone modular unit that offers multi-input support, flexibility, and ease of use and integration with full support of 3G/HD/SD-SDI, CVBS, AES and analog audio as inputs as well as outputs. SDI input can be set to failover to the CVBS input on loss of input conditions as well as user-configurable subjective criteria such as black/frozen frame or audio silence. Two discrete character burn strings can be inserted on output video, with each string inserted as static text and/or insert only upon LOS. Import of user trouble slate graphics is also supported in addition to standard test pattern insert as an input LOS marker. A moving-box insertion can be enabled to serve as a dynamic raster confidence check even in cases where the input video image is static.

The up/down/cross convert scaler is specifically designed for broadcast video progressive and interlaced formats, with full ARC control suitable for conversions to or from 4:3 and 16:9 aspect ratios. Timecode can be received and prioritized among any standard SMPTE embedded or audio LTC timecode, and in turn outputted and burned-in on the output video.

The BBG-1002-UDX-AAV-AES uses a built-in web server that allows control/monitor over computers or smart devices from anywhere accessible over the web; no special apps or plug-ins are required for remote control. The compact 1/3-rack size of the BBG-1002-UDX-AAV-AES allows 3 units to be installed in a 1RU space (an optional mounting tray is available that provides secure mounting of the units to a standard 19" frame).

» FEATURES

Full I/O support of 3G/HD/SD-SDI, CVBS, AES and analog audio. AES and analog audio embed/de-embed.

Auto-Changeover can be set to invoke failover for basic input loss as well as subjective failover based on black/frozen frame or audio silence. Threshold and hold-off are user configurable.

Moving-box/motion insertion enable serves as a dynamic raster confidence check even when the input video image is static

Up/Down/Cross Conversion and ARC specifically tailored for broadcast video

Dual independent burn-in text string insertion allows condition-based insertion (such as basic ID text for valid input and different text message for failover conditions)

Supports import of user trouble slate graphic file for LOS failover insertion

Timecode processing can prioritize, filter for, and convert between specific SMPTE embedded-video or audio LTC, with output/burn-in timecode using selected format

Framesync with full H/V offset and manual/LOS video pattern generator. Framesync can also convert raster format between 29.97/59.94 and 30/60 formats. Rear-panel looping reference connectors.

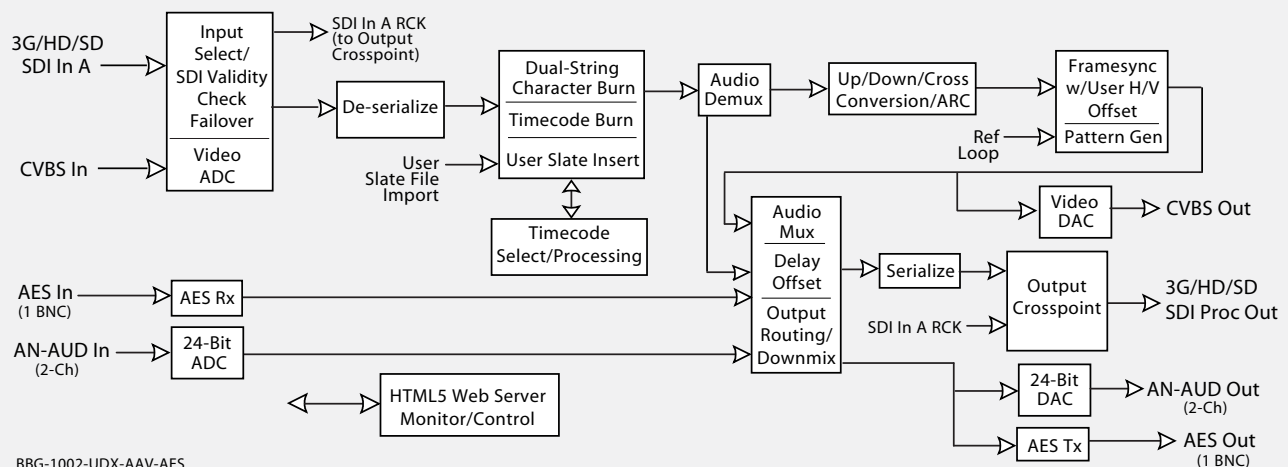
Full audio crosspoint with delay control and 5.1-to-stereo downmix available for all audio outputs

Web-based user interface/remote control as well as front-panel LCD local control

Redundant power supply option

Compact footprint - up to 3 units in a 1RU space

Five-year warranty



BBG-1002-UDX-AAV-AES

BBG-1002-UDX-AAV-AES

SPECIFICATIONS

Power

< 18 Watts. Power supplied by 12VDC AC adapter, universal input.

SDI Video Input/Outputs

(1) 75Ω BNC input
 (1) 75Ω BNC output (selectable as SDI IN A Processed or RCK).
 SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
 SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
 SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
 SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI

CVBS Video Input/Outputs

(1) 75Ω BNC input
 (1) 75Ω BNC output. CVBS can be upscaled to any supported SDI format; all SDI formats can be downconverted to CVBS.

Discrete Audio Input/Outputs

(1) AES-3id 75Ω BNC input
 (1) AES-3id 75Ω BNC output
 (2) Balanced analog audio inputs
 (2) Balanced analog audio outputs. I/O conforms to 0 dBFS = +24 dBu.

Input Select/Auto-Changeover Failover

- Manual selection (forced) of any input via web GUI or front panel controls.
- Failover to alternate input on loss of target input. Failover invoked upon LOS or user configurable parametric criteria such as black/frozen frame or audio silence.
- Black frame trigger configurable for black intensity threshold and persistence time.
- Frozen frame trigger configurable for frozen percentage difference and persistence time.
- Audio silence trigger configurable for dBFS floor threshold and persistence time.

Timecode Insertion/Burn-In

Burn-in and embedded video output timecode selected via user controls from input video SMPTE embedded timecode and/or audio LTC. Burn-in enable/disable user controls. Configurable for burn-in string of seconds, seconds:frames, seconds:frames:field. User controls for text size and H/V position.

Text Burn-In

(2) independent strings supported. Independent insertions controls for enable/disable and enable upon LOS. User controls for text size and H/V position.

Audio Processing

Full crosspoint and gain/mute/invert controls across 16-ch embedded audio SDI processed path. Embedding from analog or AES sources to any embedded channels; de-embedding to AES or analog outputs. Multi-frequency tone generator for each audio output. Downmix output available for any output channel pair. Master delay control; range of -33 msec to +3000 msec.

Control/Monitor Interface

HTML5 web server/interface via rear-panel 100/1000 Ethernet port.

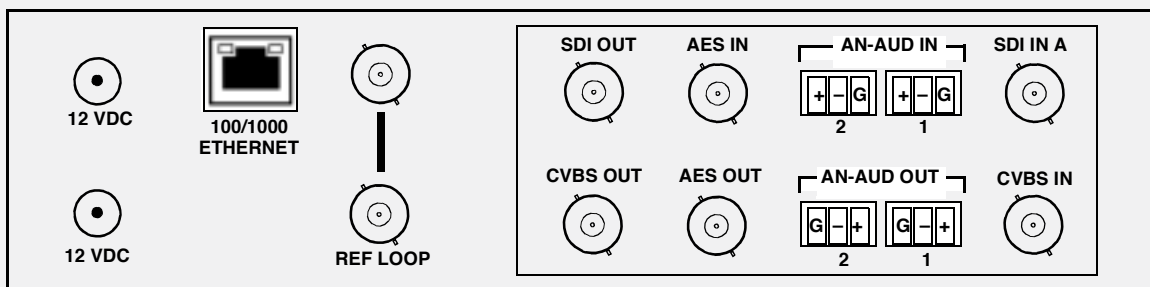
Frame Reference Input

Looping 2-BNC connection. SMPTE 170M/318M "Black Burst", SMPTE 274M/296M "Tri-Level" Return Loss: >35 dB up to 5.75 MHz

Physical

Dimensions (WxHxD): 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.

Weight: 6 lb (2.8 kg)



ORDERING INFORMATION

BBG-1002-UDX-AAV-AES Modular Up-Down-Cross Converter/Framesync with Universal I/O and Character Burn

BBG-1000-PS Redundant (n+1) Power Supply Module

BBG-1000-TRAY 1RU Mounting Tray (supports 3 units)

» 6000 / 8000 SERIES POWER SUPPLIES

» ALTERNATE BASE MODELS

<p>PS11</p>		<p>PS11 Universal Power Supply, UL/CSA, input: 100-240 60/50 Hz, Output: 5 VDC @ 12 watts</p>
<p>PS12</p>		<p>PS12 Universal Power Supply, IEC Connector, CE/UL/CSA, Input: 100-240 60/50 Hz, Output: 5V 2A (International Power Supply. Specify country of destination.)</p>
<p>PS24</p>		<p>PS24 Universal Power Supply, IEC connector, CE/UL/CSA, input: 100-240 60/50 Hz, Output: 12 VDC @ 30 watts</p>
<p>PS4</p>		<p>PS4 Universal Power Supply, UL/CSA, input: 100-240 60/50 Hz, Output: 5 VDC @ 12 watts</p>
<p>PS5</p>		<p>PS5 Universal Power Supply, IEC Connector, CE/UL/CSA, Input: 100-240 60/50 Hz, Output: 5V 2A (International Power Supply. Specify country of destination.)</p>

Cobalt Digital is proud to stand behind our products with world-class support and service.

Should you have any questions about a Cobalt product, please feel free to contact us by phone (toll free 1-800-669-1691 or +1-217-344-1243), or email any questions directly to our technical support team (support@cobaltdigital.com) for prompt assistance.

For product manuals, quick reference guides, and technical resources, visit www.cobaltdigital.com/documents. For the latest firmware updates for your Cobalt openGear® card, visit www.cobaltdigital.com/firmware.

Five-year Warranty

Five-year warranty on all Cobalt Digital products with the exclusion of fans, power supplies and Dolby® modules, which carry a one year warranty. For a full copy of the Cobalt Digital Inc. warranty statement, please visit www.cobaltdigital.com. Cobalt Digital Inc. 2013.

Factory Service Center

Cobalt Digital Inc.
2406 East University Avenue, Urbana, IL 61802 USA
Voice: 217-344-1243 · Fax: 217-344-1245
sales@cobaltdigital.com / support@cobaltdigital.com



LIVE ONLY HAPPENS ONCE.



17 Years Providing Equipment and Confidence for Sports Production

Terminal Gear; Infrastructure Product to Meet Engineering Needs

24/7 Service and Support

5-Year Warranty

Developed and Manufactured in North America

AT COBALT DIGITAL WE KNOW YOU ONLY GET ONE CHANCE TO GO LIVE.

That's why our audio and video distribution solutions are designed for optimum stability and reliability. From fiber transmission to Up/Down/Cross conversion to Color Correction and much more, Cobalt Digital has an extensive range of products to ensure that your mobile applications and live events go off without a hitch. Don't let the next signal take you by surprise. *Be ready...because live only happens once.*

COBALT DIGITAL ENGINEERING BEYOND THE SIGNAL™



Cobalt Digital Inc. designs and manufactures award-winning 3G/HD/SD conversion, throwdown, and multiviewer technology for the broadcast television environment. As a founding partner in the openGear® initiative, Cobalt offers a full range of openGear-compliant solutions as well as video and audio processing cards for closed-caption compliance, production trucks, master control, HD news, signal transport, audio loudness, and color correction. Cobalt's Blue Box Group™ line of interface converter boxes streamlines and simplifies a wide range of 3G/HD/SD conversion tasks. In addition, the company's multi-image display processors enable multiviewer capabilities in the most demanding studio and remote broadcasting environments. Cobalt Digital products are distributed through a worldwide network of dealers, system integrators, and other partnerships.

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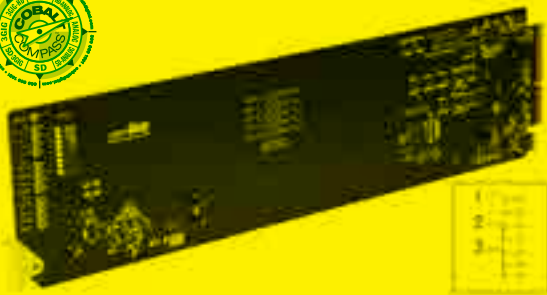
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Bob.Nicholas @ cobaltdigital.com
Director of International Business Development

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COBALT[®]

9005 » TRIPLE-CHANNEL 3G/HD/SD RECLOCKING DISTRIBUTION AMPLIFIER



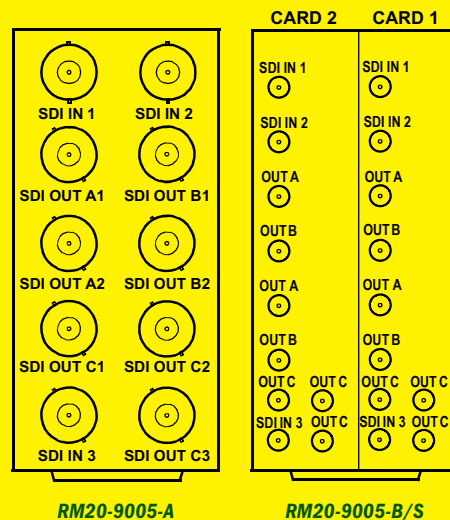
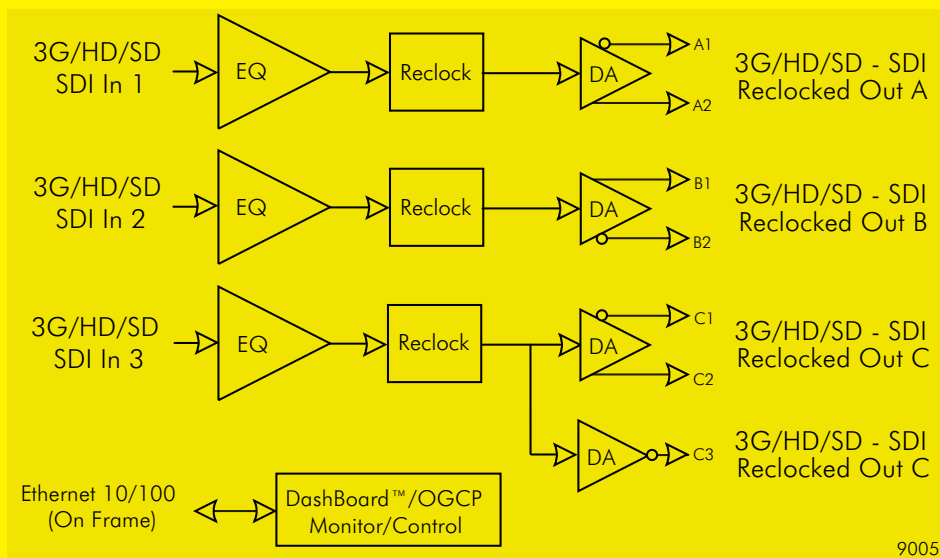
The 9005 is a three-channel, multi-rate SDI distribution amplifier capable of equalizing and reclocking 3G, HD, and SD signals. Excellent receiver EQ performance allows for up to 160m cable lengths for HD signals.

» FEATURES

Automatic rate detection/display for all popular data rates

Remote control/monitoring via DashBoard™ software or OGCP-9000 remote control panel

Five year warranty



» SPECIFICATIONS

Electrical

Power: 3 watts

3G/HD/SD-SDI Input

Number of Inputs: 3
 Standard: SMPTE 424M, 292M, and 259M
 Return Loss: >15 dB at 5 MHz - 1.485 GHz
 >10 dB at 1.5 GHz to 3 GHz

3G/HD/SD-SDI Output

Number of outputs: 7 (3 ASI Compatible)
 Standard: SMPTE 424M, 292M, and 259M
 Signal Level: 800 mV nominal
 Return Loss: >15 dB at 5 MHz - 1.485 GHz
 >10 dB at 1.5 GHz to 3 GHz
 Jitter (wideband): HD: < 0.2 UI

» ORDERING INFORMATION

9005 Triple-Channel 3G/HD/SD Reclocking Distribution Amplifier, 3 Channels: 1x2, 1x2, 1x3

RM20-9005-A 20 Slot Frame Rear I/O Module (Standard Width) Triple 3G/HD/SD-SDI Inputs, 7 Reclocked 3G/HD/SD-SDI Outputs (1x2 / 1x2 / 1x3)

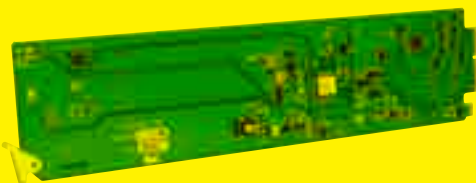
RM20-9005-B/S-HDBNC 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Triple 3G/HD/SD-SDI Inputs, 7 Reclocked 3G/HD/SD-SDI Outputs (1x2 / 1x2 / 1x3) (HDBNC High Density)

RM20-9005-B/S-DIN 20 Slot Frame Rear I/O Module (Split; connections listed are per card) Triple 3G/HD/SD-SDI Inputs, 7 Reclocked 3G/HD/SD-SDI Outputs (1x2 / 1x2 / 1x3) (DIN 1.0/2.3 High Density)



9284 » VIDEO ROUTING SWITCHER

3G/HD/SD-SDI 8x4 Video Routing Switch



The 9284 provides card-based solutions for SDI routing. Utilizing the openGear® open-architecture platform, the card offers scalable incorporation and the easy-to-use Dashboard™ setup and control operator interface. The video routing switch accepts up to eight SDI inputs and routes these inputs to up to four SDI outputs using Dashboard™ network remote control or generic serial-based command string protocol. All inputs are equipped with cable equalizers (which can be enabled or disabled as desired). All outputs are equipped with reclocking, which can independently be set for auto reclock, format-specific reclock, or reclock turned off. Source-to-destination routing is non-inverting, thereby allowing these cards to pass DVB-ASI signals.

The card switches on the correct line in the vertical blanking interval if a video reference is present at one of the two reference inputs on the rear of the openGear frame. Full user remote and card-edge monitor/control allows full card status and control access locally or across a standard Ethernet network.

» FEATURES

Card-based design allows scalability, from 1 to 5 cards per frame

Switching done on selected VBI line, allowing no visible artifacts during active video

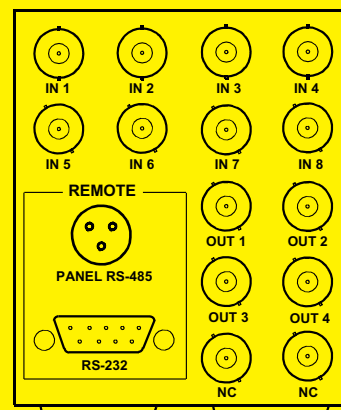
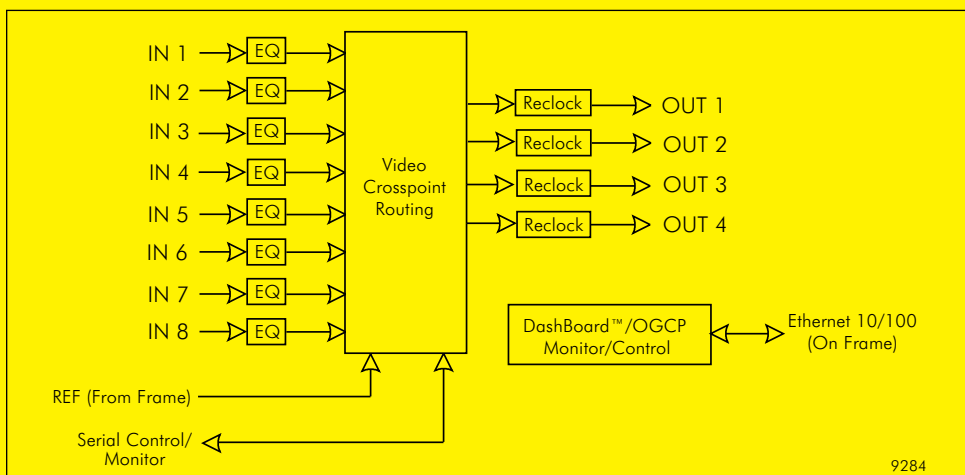
Low power/high-density design; <10 Watts per card

DVB-ASI compliant

User-defined salvos allow single-button launch of switching

Remote control/monitoring via Dashboard software or OGCP-9000 remote control panel and/or via RS-232 serial control Command String Protocol.

Five-year warranty



RM20-9284-D

» SPECIFICATIONS

Electrical

Power: 10 watts

3G/HD/SD-SDI Inputs

Number of inputs: 8

Standards: 3G-SDI (SMPTE 424M)

HD-SDI (SMPTE 292M)

SD-SDI (SMPTE 259M)

Impedance: 75 Ω

Equalization (3G, HD): 328 ft (100 m) Belden 1694A for SMPTE 292-2008, 424M-2006

Equalization (SD): 1000 ft (305 m) Belden 1694A for SMPTE 259M-2008

Return Loss: > 15 dB at 5 MHz - 1.485 GHz

> 10 dB at 1.5 GHz - 3.0 GHz

SDI Outputs

Number of Outputs: 2, 75Ω BNC (9282)

4, 75Ω BNC (9284)

Reference Video Input

Number of Inputs: Two non-terminating (looping) Frame Reference inputs

Standards Supported (HD): 720p 24; 25; 29.97; 30; 50; 59.94 1080i 25; 29.97

1080p 23.98; 24; 25; 29.97; 30; 50; 59.94 1080p/sF

23.98; 24

Standards Supported (SD): 486i 29.97 (NTSC)

575i 25 (PAL)

Signal Level: 1 Vp-p nominal

Signal Type: Analog video sync (black burst or tri-level)

Impedance: 75 Ω

» ORDERING INFORMATION

9284 3G/HD/SD-SDI 8x4 Video Routing Switch

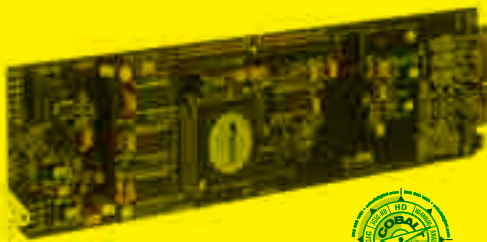
RM20-9284-D 20-Slot Frame Rear I/O Module (Double Width) 8 SDI BNC Inputs, 4 SDI BNC Outputs, RS-485, RS-232/422 Serial Control Connectors

9822 » DOWNCONVERTER

with HD/SD-SDI Input and Frame Sync

OPTIONS

Audio Mixing (+AMx), Loudness Metering (+LM-C), Linear Acoustic® Upmixing (+UM), LTC In/Out (+LTC)

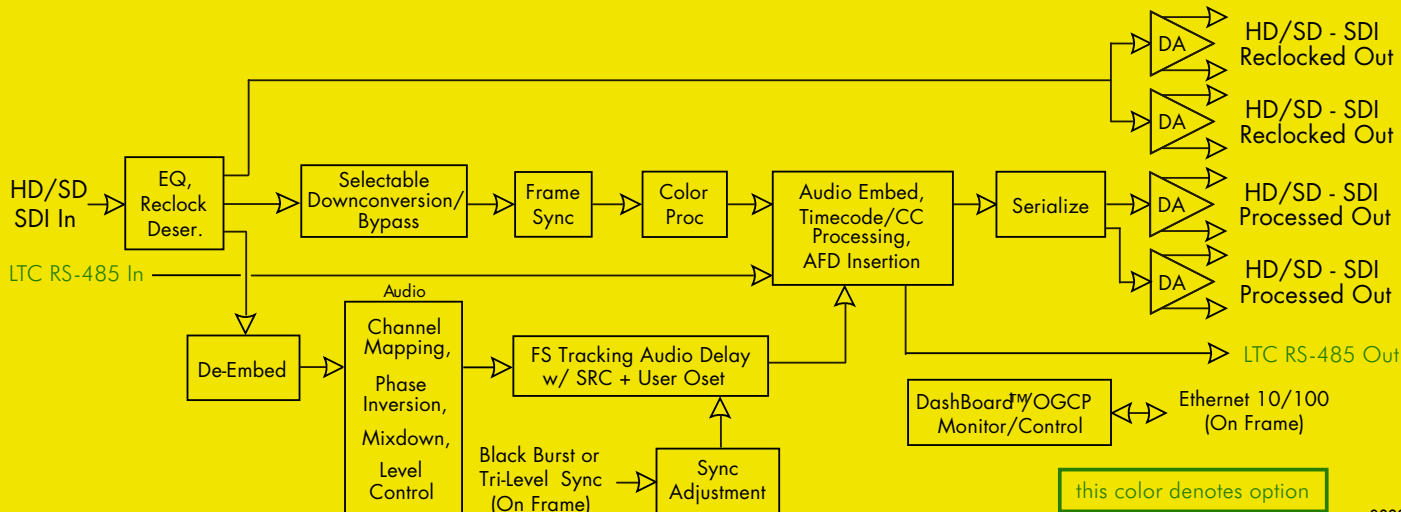


The 9822 provides HD-SDI to SD-SDI downconversion that preserves closed captioning, timecode, AFD, and embedded audio. The downconverter allows downconversion from several HD formats to SD, or can pass HD video without conversion.

The 9822 also provides AFD functions that detect the incoming AFD code, allow independent custom ARC to be applied for each incoming AFD code, and set the desired AFD code to be inserted on the output, even if there is no code detected on the input. Full user remote and card-edge processing control with user memory allow adjustment of gain, offset, saturation, hue, audio levels, audio routing, frame sync, and many other controls. Factory presets enable a return to factory settings.

» FEATURES

HD/SD digital inputs	Selectable safe action, safe title, and center cross overlays	Full aspect ratio conversion with pan	Full 10-bit video path and 12-bit analog encoding
HD/SD closed captioning support and flexible timecode processing	Timecode insertion/conversion. +LTC option allows LTC input/output on shared port, with bi-directional conversion between VBI and LTC on RS-485 or embedded audio I/O.	Embedded audio offset adjustment for lip-sync alignment	Detail enhancement and noise reduction
AFD code insertion and AFD ARC control	Frame sync with tracking audio delay	Audio channel mapping, downmixing, and level control	Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels
User-defined audio offset can be applied in frame sync to align Dolby® delay		16 user presets	Five-year warranty



9822

» ORDERING INFORMATION

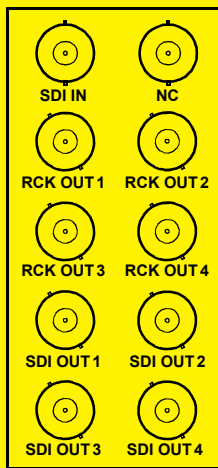
9822 Downconverter with HD/SD-SDI Input, Embedded Audio, Frame Sync, Timecode and Closed Caption Support

RM20-9822-A 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 SDI Reclocked Outputs, 4 Processed Outputs

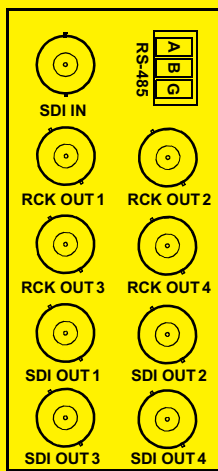
RM20-9822-B 20-Slot Frame Rear I/O Module (Standard Width) HD/SD-SDI Input, 4 HD/SD-SDI Reclocked Outputs, 4 HD/SD-SDI Processed Outputs, RS-485 LTC / Metadata I/O Port



9822



RM20-9822-A



RM20-9822-B

» FORMAT CONVERTERS	9061	9062	9064	9066	9067	9068	9821	9822
SDI Inputs	1	1	1	1	1	1	1	1
SDI Processed Outputs	2	4	4	2	4	4	4	4
SDI Input Copies	0	4	4	0	4	4	4	4
Analog Video Input	.			.				
Analog Video Output							.	
Analog Audio Input	.			.				
Analog Audio Output							.	
Remote Control & Monitoring	.	.	.	.	.	.	.	.
SNMP	.	.	.	.	.	.	.	.
AES Embedding	.			.				
AES De-Embedding	.			.				
Frame Sync	.	.	.	.	.			.
Upconversion	.	.	.	.	.	.
Downconversion	.	.	.				.	.
Cross Conversion	.	.	.					
HD <-> SD Closed Captioning	.	.	.	.	.	.	.	.
HD <-> SD Timecode Conversion	.	.	.	.	.	.	.	.
HD <-> SD Emb Audio Conversion	.	.		.	.	.	.	.
Embedded Audio Delay	.	.		.	.			.
Adjustable Video Delay	.	.		.	.			.
AFD ARC Control	.	.	.	.	.	.		.
AFD Code Insertion	.	.	.	.	.	.		.
Audio Downmixing	.	.		.	.			.
Color Correction			.					

» SPECIFICATIONS

Power

18 watts

HD/SD-SDI Input

Number of Inputs: 1
 Standard: SMPTE 259M, 292
 Return Loss: > 15 dB at 5 MHz 1.485 GHz

Reference Video Input

Number of Inputs: 2 looping (openGear® frame)
 Standard: Tri-level sync (SMPTE 274) and black burst (NTSC and PAL)

HD/SD-SDI Output

Number of Outputs: 4 reclocked, 4 processed
 Standard: SMPTE 259M, 292
 Signal Level: 800 mV nominal
 Return Loss: > 15 dB at 5 MHz -270 MHz
 Jitter: < 0.1 UI
 Embedded Audio: 16-Ch SD

Note: This card uses a daughtercard mounted on the card right-side (viewed from front). As such, this card cannot be installed in Slot 20 of a 20-slot frame (the card must be installed in even-numbered slots 2 through 18). Please note this when fitting out a frame using this card.

8021 » HD/SD UP/DOWN/CROSS CONVERTER

with Digital and Analog Outputs

**BLUE
BOX**

The 8021 accepts dual rate HD/SD SMPTE-292/259M-C digital inputs and can up or downconvert incoming signals and re-aspect to 4x3 or 16x9. In addition, the 8021 can cross convert HD signals between 1080 and 720. Both digital and analog HD/SD and XGA outputs are available. The 8021 can rate convert 24 frame video to 60 frames and move interlace to progressive and back. The unit also has user configurable reticle overlays. The 8021 has full 10-bit video processing with 12-bit analog encoding. The 8021 allows you to pick your monitor or scope, HD or SD (analog or digital) or XGA analog and view HD-SDI or SDI. User setups are by external switch controls or a serial PC interface. The unit can be controlled remotely for monitoring wall applications.

» FEATURES

High quality down and monitoring quality upconversion

Three outputs: HD/SD digital or analog HD and SD

Auto standard detect and configuration SMPTE 292/259M-C

Full aspect ratio conversion (two axis)

Outputs wideband analog YPbPr, RGB or XGA

Four user programmable reticules

PC remote control available

3:2 pull-down

Two dual rate HD/SD reclocked input copies

10-bit video path and 12-bit analog encoding

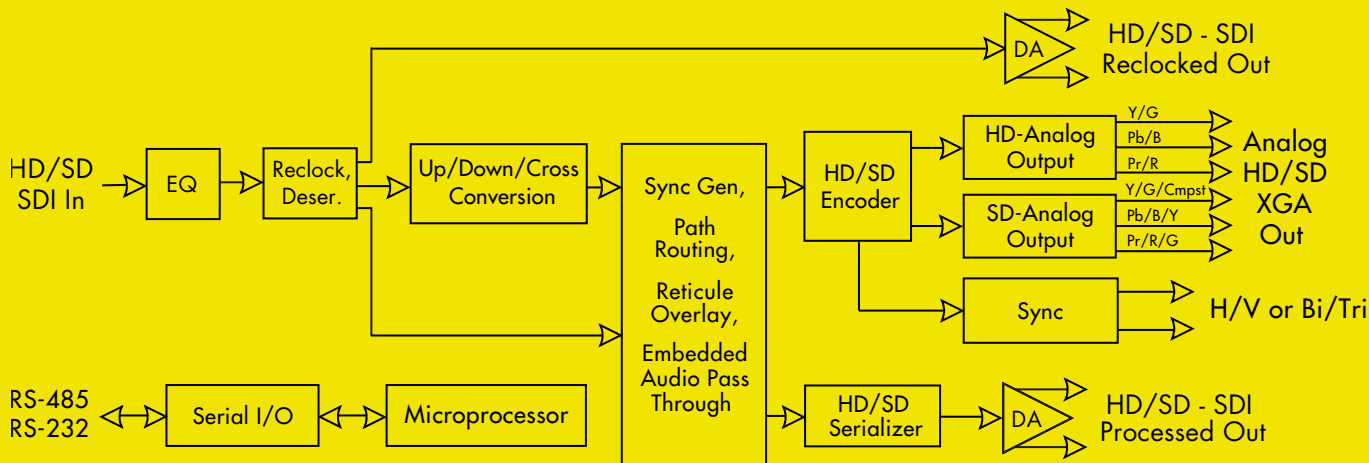
Supports 16 channels of embedded audio in all conversion formats

Automatic audio delay tracking with user offset

External configuration switches and remote port

Adjustable output gain control

Five-year warranty



8021

» SPECIFICATIONS**Input**HD-SDI SMPTE-292 and SD-SDI
SMPTE-259M-C**Output**Two reclocked HD/SD input copies
HD: YPbPr, RGB or XGA w/tri/bi or H&V sync
SD: composite, component and Y/C
Two up or down converted HD/SD outputs**Frequency Response**HD: Y: 28 MHz +/- 0.25 dB, Pb/Pr: 13 MHz
+/- 0.25 dB
SD: 0-5.25 MHz +/- 0.25 dB**Overlay Reticules**Four presets types: center cross, 4x3 safe area, 4x3 full
aperature, and 16x9 safe area with user programmable
size and thickness.
Colors: black, white or user defined color.**Processing Control**Digital control of gain, DC, saturation and
hue with user values saved and factory presets**Power**5-18 VDC @ 9 watts
Requires Power Supply PS24**Size**

10.3" x 5.9" x 1" (260 x 150 x 25 mm)

» ORDERING INFORMATION**8021** 10-bit Digital Up/Down/Cross Converter with HD/SD Analog and HD/SD Digital
Outputs (Includes one HD5BNC Cable)**PS24** Universal Power Supply, IEC Connector, CE/UL/CSA, Input: 100-240 60/50 Hz,
Output: 12V 2.5A

8022 » HD/SD UP/DOWN/CROSS CONVERTER

with Digital and Analog Outputs



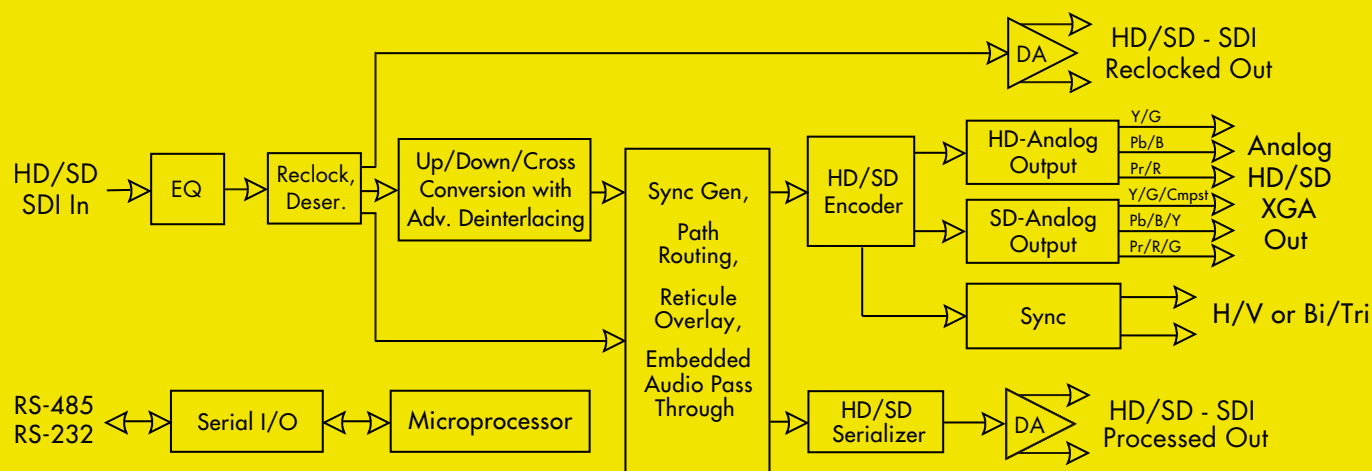
The 8022 is an HD/SD converter featuring advanced 10-bit format conversion. The 8022 accepts HD/SD SMPTE-292/259M SDI and can up or downconvert incoming signals and re-aspect to 4 x 3, 16 x 9 or user programmable aspect ratios. In addition, the 8022 can cross-convert HD signals between 1080 and 720. Both digital and analog HD/SD and XGA outputs are available. The 8022 can frame-rate convert 24 frame video to 60 frames, move interlaced to progressive, and progressive to interlaced. The unit also has extensive user-configurable reticule overlays.



The 8022 uses 10-bit video processing, advanced de-interlacing and motion adaptation with 12-bit analog encoding. The 8022 includes embedded audio passthrough with delay correction. The unit can be configured via DIP switches or remote controlled.

» FEATURES

High quality up, down and cross format conversion	Four user programmable reticules	Supports 16 channels of embedded audio in all conversion formats
Three outputs: HD/SD digital or analog HD and SD	PC remote control available	Automatic audio delay tracking with user offset
Auto standard detect and configuration SMPTE 292/259M	3:2 frame rate and HD standards conversion	External configuration switches and remote port
Full aspect ratio conversion and pan controls	Two dual rate HD/SD reclocked input copies	Adjustable output gain control
Wideband analog YPbPr, RGB or XGA output	10-bit video path and 12-bit analog encoding	Five-year warranty



8022

» SPECIFICATIONS

<p>Input HD-SDI SMPTE-292 and SD-SDI SMPTE-259M</p>	<p>Sync Output Bi or tri-level and XGA H/V</p>	<p>Power 5-18 VDC @ 12 watts Requires Power Supply PS24</p>
<p>Output 2 reclocked HD/SD input copies 2 up/down/cross converted HD/SD outputs HD: YPbPr, RGB or XGA w/tri/bi or H&V sync SD: composite, component and Y/C</p>	<p>Overlay Reticules 4 presets types: center cross, 4x3 safe area, 4x3 full aperture, and 16x9 safe area with user programmable size and thickness. Colors: black, white, red, blue or user defined color</p>	<p>Size 10.3" x 5.9" x 1" (260 x 150 x 25mm)</p>
<p>Frequency Response HD: Y: 28 MHz +/- 0.25 dB, Pb/Pr: 13 MHz +/- 0.25 dB SD: 0-5.25 MHz +/- 0.25 dB</p>	<p>Processing Control Digital control of gain, DC, saturation and hue with user values saved and factory presets</p>	

» ORDERING INFORMATION

8022 Up/Down/Cross Converter with 8021 features and Advanced Deinterlace with Motion Adaptation (Includes one HD5BNC Cable) **PS24** Universal Power Supply, IEC Connector, CE/UL/CSA, Input: 100-240 60/50 Hz, Output: 12V 2.5A